

**Registration form**

**Invasive Plant Identification and Control Course \$200.00  
48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL \$50.00**

**Start and finish dates:** \_\_\_\_\_

*You will have 90 days from this date in order to complete this course*

**Print Name** \_\_\_\_\_

I have read and understood the disclaimer notice found on page 2 and 6. Signature is required.

**Signature** \_\_\_\_\_

**Address:** \_\_\_\_\_

**City** \_\_\_\_\_ **State** \_\_\_\_\_ **Zip** \_\_\_\_\_

**Phone:**  
**Home** (\_\_\_\_\_) \_\_\_\_\_ **Work** (\_\_\_\_\_) \_\_\_\_\_

**Fax** (\_\_\_\_\_) \_\_\_\_\_ **Email** \_\_\_\_\_

**License or  
Operator ID #** \_\_\_\_\_ **Exp. Date** \_\_\_\_\_

**Please circle/check which certification you are applying the course CEU's.**

Commercial Applicator\_\_\_\_ Residential Applicator\_\_\_\_ Industrial Applicator\_\_\_\_

Pesticide Handler\_\_\_\_ Agricultural Applicator\_\_\_\_ Adviser\_\_\_\_ Other \_\_\_\_\_

***Your certificate will be mailed to you in about two weeks.***

**Technical Learning College TLC PO Box 3060, Chino Valley, AZ 86323  
Toll Free (866) 557-1746 Fax (928) 272-0747 email info@tlch2o.com**

**If you've paid on the Internet, please write your Customer#** \_\_\_\_\_

***We will stop mailing the certificate of completion we need your e-mail address.***

***We will e-mail the certificate to you, if no e-mail address; we will mail it to you.***

## **DISCLAIMER NOTICE**

I understand that it is my responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. I understand State laws and rules change on a frequent basis and I believe this course is currently accepted in my State for CEU or contact hour credit, if it is not, I will not hold Technical Learning College responsible. I fully understand that this type of study program deals with dangerous, changing conditions and various laws and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable in any fashion for any errors, omissions, advice, suggestions or neglect contained in this CEU education training course or for any violation or injury, death, neglect, damage or loss of your license or certification caused in any fashion by this CEU education training or course material suggestion or error or my lack of submitting paperwork. It is my responsibility to call or contact TLC if I need help or assistance and double-check to ensure my registration page and assignment has been received and graded. It is my responsibility to ensure all information is correct and to abide with all rules and regulations.

*You can obtain a printed version of the course manual from TLC for an additional \$69.95 plus shipping charges.*

## **AFFIDAVIT OF EXAM COMPLETION**

I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

## **Grading Information**

In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we've received your assignment and to confirm your identity.

**Do not solely depend on TLC's Approval list for it may be outdated.**

**Some States and many employers require the final exam to be proctored.**

<http://www.abctlc.com/downloads/PDF/PROCTORFORM.pdf>

**A second certificate of completion for a second State Agency \$50 processing fee.**

**All downloads are electronically tracked and monitored for security purposes.**

**No refunds.**

# Invasive Plant Identification CEU Course Answer Key

Name \_\_\_\_\_

Telephone \_\_\_\_\_

**Multiple Choice. Pick only one answer per question.**

**You are solely responsible to ensure that this course is accepted for credit by your State. Did you check with your State agency to ensure this course is accepted for credit? No refunds.**

*Method of Course acceptance confirmation. Please fill this section*

Website \_\_ Telephone Call\_\_ Email\_\_\_\_ Spoke to\_\_\_\_\_

Did you receive the approval number, if applicable? \_\_\_\_\_

What is the course approval number, if applicable? \_\_\_\_\_

*You are responsible to ensure that TLC receives the Assignment and Registration Key. Please call us to ensure that we received it.*

**Circle or Mark off or Bold the answer. Please circle the number of the assignment version 1 or 2 or 3 or 4 or 5**

**Complete all the Topical Sections before submitting the answer key**

**Weed Identification Section**  
Ten Questions

**Topic 1**

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Invasive Plant Species Introduction**  
Ten Questions

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

**Topic 2**

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Commonly Found Invasive and/or Noxious Weeds**  
Ten Questions

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

**Topic 3**

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Herbs and Related Invasive Species**  
Ten Questions

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

**Topic 4**

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Vine Section - Alien Plant Invaders**  
Ten Questions

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

**Topic 5**

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Trees- Alien Plant Invaders**

**Topic 6**

Ten Questions

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Weed Management and Control Section**

**Topic 7**

Ten Questions

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Introduction to Wetlands Section**

**Topic 8**

Ten Questions

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Submersed Aquatic Weed Section**

**Topic 9**

Ten Questions

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Aquatic Herbicides and Controls Section**  
Ten Questions

**Topic 10**

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Invasive Plant Rule Section**  
Ten Questions

**Topic 11**

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F

6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

**Amount of Time for Course Completion – How many hours you spent on course?**

**Must match State Hour Requirement \_\_\_\_\_ (Hours)**

Please fax or email this answer key and the registration Page to TLC.  
Call 15 minutes later to ensure we have received the paperwork

**Please e-mail or fax this survey along with your final exam**

**INVASIVE PLANT IDENTIFICATION AND CONTROL  
PROFESSIONAL DEVELOPMENT COURSE  
CUSTOMER SERVICE RESPONSE CARD**

NAME: \_\_\_\_\_

E-MAIL \_\_\_\_\_ PHONE \_\_\_\_\_

**PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.**

1. Please rate the difficulty of your course.

Very Easy 0 1 2 3 4 5 Very Difficult

2. Please rate the difficulty of the testing process.

Very Easy 0 1 2 3 4 5 Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.

Very Similar 0 1 2 3 4 5 Very Different

4. How did you hear about this Course? \_\_\_\_\_

5. What would you do to improve the Course?

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How about the price of the course?

Poor \_\_\_\_ Fair \_\_\_\_ Average \_\_\_\_ Good \_\_\_\_ Great \_\_\_\_

How was your customer service?

Poor \_\_\_\_ Fair \_\_\_\_ Average \_\_\_\_ Good \_\_\_\_ Great \_\_\_\_

Any other concerns or comments.

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## Important Information about this Course (Disclaimer Notice)

This CEU course has been prepared to educate pesticide applicators and operators in general safety awareness of dealing with the often-complex and various pesticide treatment sprays, devices, methods, and applications. This course (manual) will cover general laws, regulations, required procedures and accepted policies relating to the use of pesticides and herbicides. It should be noted, however, that the regulation of pesticides and hazardous materials is an ongoing process and subject to change over time. For this reason, a list of resources is provided to assist in obtaining the most up-to-date information on various subjects. This manual is not a guidance document for applicators or operators who are involved with pesticides. It is not designed to meet the requirements of the United States Environmental Protection Agency or your local State environmental protection agency or health department. This course manual will provide general pesticide safety awareness and should not be used as a basis for pesticide treatment method/device guidance. This document is not a detailed pesticide informational manual or a source or remedy for poison control.

Technical Learning College or Technical Learning Consultants, Inc. makes no warranty, guarantee or representation as to the absolute correctness or appropriateness of the information in this manual and assumes no responsibility in connection with the implementation of this information. It cannot be assumed that this manual contains all measures and concepts required for specific conditions or circumstances. This document should be used for educational purposes only and is not considered a legal document. Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property or plants being treated. Avoid drift onto neighboring properties, especially gardens containing fruits and/or vegetables ready to be picked. Dispose of empty containers carefully. Follow label instructions for disposal. Never reuse containers. Make sure empty containers are not accessible to children or animals. Never dispose of containers where they may contaminate water supplies or natural waterways. Do not pour down sink or toilet. Consult your county agricultural commissioner for correct ways of disposing of excess pesticides. You should never burn pesticide containers.

Individuals who are responsible for pesticide storage, mixing and application should obtain and comply with the most recent federal, state, and local regulations relevant to these sites and are urged to consult with the EPA and other appropriate federal, state and local agencies.

USE PESTICIDES WISELY: ALWAYS READ THE ENTIRE PESTICIDE LABEL CAREFULLY, FOLLOW ALL MIXING AND APPLICATION INSTRUCTIONS AND WEAR ALL RECOMMENDED PERSONAL PROTECTIVE GEAR AND CLOTHING. CONTACT YOUR STATE DEPARTMENT OF AGRICULTURE FOR ANY ADDITIONAL PESTICIDE USE REQUIREMENTS, RESTRICTIONS OR RECOMMENDATIONS.

**NOTICE:** MENTION OF PESTICIDE PRODUCTS IN THIS COURSE DOES NOT CONSTITUTE ENDORSEMENT OF ANY MATERIAL OR HERB OR HERBAL SUPPLEMENT. ALWAYS FOLLOW THE PRODUCT'S LABEL INSTRUCTIONS.

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### **Grading Information**

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**All downloads are electronically tracked and monitored for security purposes.**



## **INSTRUCTIONS**

1. We will require all students to fax or e-mail a copy of their driver's license with the registration form.
2. You will need to pick one of the following four assignments to complete. This selection process is based upon your last name.

### **Assignment for Last Names**

*If your last name...*

**T-Z - Assignment #1 pages 11-26**

**N-S - Assignment #2 Pages 27-42**

**H-M - Assignment #3 Pages 43-58**

**A-G - Assignment #4 Pages 59-74**

**Alternative Assignment #5 for repeat students Pages 75-90**

**These exams are frequently rotated.  
Complete all topics before submitting the answers key.**

### **2017 Changes to EPA's Farm Worker Protection Standard**

*In late 2015 the Environmental Protection Agency issued the long awaited revision to the Worker Protection Standard (WPS). This law it is now technically active and it will be enforced. Please keep in mind that the WPS covers both restricted use AND general use pesticides. This course is not for worker and/or handler training. Always follow the label and your State Pesticide Agency rules.*

*This course contains EPA's federal rule requirements. Please be aware that each state implements pesticide regulations that may be more stringent than EPA's regulations and these frequently are changed. Check with your state environmental/pesticide agency for more information.*

### **Rush Grading Service**

If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of \$50.00. This fee may not cover postage costs. If you need this service, simply write RUSH on the top of your Registration Form. We will place you in the front of the grading and processing line.

**All downloads are electronically tracked and monitored for security purposes.**



# Invasive Plant Identification CEU Conventional Assignment #1

You will have 90 days from the start of this course to have successfully completed this CEU assignment with a score of 70%. You may e-mail the answers to TLC, info@tlch2o.com, you can also find a copy of this assignment in Word on the Assignment Page on TLC's website or fax the answers to TLC (928) 468-0675. Write your answers on the Answer Key found in the front of first assignment.

**Write your answers on the Answer Key found in the front section of this assignment.**

## Weed Identification Section Topic 1

(s) Means the answer can be plural or singular.

- \_\_\_\_\_ weeds germinate from seed, grow, flower, and produce seed in less than one year.  
A. Winter annual(s)      D. Summer and winter annual(s)  
B. Summer annual(s)    E. Annual(s)  
C. Biennial(s)            F. None of the Above
- \_\_\_\_\_ germinate in the spring and mature in the fall, whereas winter annuals (AKA cool season annuals) germinate in fall or late winter and mature in late spring.  
A. Perennial              D. Summer and winter annual(s)  
B. Summer annual(s)    E. Summer annuals (AKA warm season annuals)  
C. Biennial(s)            F. None of the Above
- \_\_\_\_\_ germinate in the fall, overwinter as seedlings or small rosettes and mature, set seed and die the following spring or early summer.  
A. Winter annual(s)    D. Summer and winter annual(s)  
B. Perennial              E. Annual(s)  
C. Biennial(s)            F. None of the Above
- Some weeds are capable of \_\_\_\_\_ lifecycles.  
A. Perennial              D. Both summer and winter annual  
B. Summer annual(s)    E. Annual(s)  
C. Biennial(s)            F. None of the Above

### Understanding Weed Terms

- The key is to use pesticides in a way that complements rather than hinders \_\_\_\_\_ in the strategy and which also limits negative environmental effects.  
A. Other elements              D. Direct habitat destruction  
B. Ecovar development process    E. Negative environmental effects  
C. Minimum levels of pesticide    F. None of the Above
- It is important to understand the life cycle of a pest so that the pesticide can be applied when the pest is \_\_\_\_\_ – the aim is to achieve maximum effect at minimum levels of pesticide.  
A. At its most vulnerable              D. Direct habitat destruction  
B. Ecovar development process        E. Negative environmental effects  
C. Minimum levels of pesticide        F. None of the Above

7. \_\_\_\_\_ are maintained via controlled pollination or vegetative means, so that cultivar characteristics are passed to ensuing generations.
- A. Cultivars  
 B. Ecovar development process(s)  
 C. Minimum levels of pesticide(s)  
 D. Direct habitat destruction  
 E. Negative environmental effect(s)  
 F. None of the Above
8. To maintain \_\_\_\_\_ in ensuing generations, little to no selection is done during the ecovar development process.
- A. Genetic diversity  
 B. Ecovar development process  
 C. Minimum levels of pesticide  
 D. Direct habitat destruction  
 E. Negative environmental effects  
 F. None of the Above
9. An ecovar is an intermediate step between a wild-growing plant and a \_\_\_\_\_.
- A. Cultivar  
 B. Ecovar development process  
 C. Minimum levels of pesticide  
 D. Direct habitat destruction  
 E. Negative environmental effects  
 F. None of the Above
10. \_\_\_\_\_ may include using row covers or trenches to prevent insects from reaching the crop, baited or pheromone traps to capture insects, or cultivation or mowing for weed control.
- A. Tactics  
 B. Ecovar development process(s)  
 C. Minimum levels of pesticide(s)  
 D. Direct habitat destruction  
 E. Negative environmental effect(s)  
 F. None of the Above

## Invasive Plant Species Introduction Topic 2

### Federally Listed Invasive Plant Species

1. \_\_\_\_\_ has elliptic to lanceolate leaves, its branches are usually thorny, and its fruit is yellow, dry and mealy.
- A. Canada thistle  
 B. Japanese knotweed  
 C. Russian thistle  
 D. Toadflax  
 E. Autumn olive  
 F. None of the Above
2. Combining control methods is the best form of \_\_\_\_\_ management. Persistence is imperative so the weed is continually stressed, forcing it to exhaust root nutrient stores and eventually die.
- A. Canada thistle  
 B. Japanese knotweed  
 C. Russian thistle  
 D. Toadflax  
 E. Autumn olive  
 F. None of the Above
3. \_\_\_\_\_ was easy to establish and homesteaders liberally landscaped their properties with this drought resistant plant, continually spreading it in their migration to the Western frontier. Also, burial sites were often adorned with toadflax to give everlasting beauty and tranquility. Their legacy has prevailed, proving to be notorious in nature.
- A. Snapdragon  
 B. Spurge laurel  
 C. Russian thistle  
 D. Toadflax  
 E. Autumn olive  
 F. None of the Above
4. The broad and pointed \_\_\_\_\_ leaves can be mistaken for Broadleaf dock (*Rumex obtusifolia*), but docks lack rhizomes and the tall, spreading habit of Japanese knotweed. Other less invasive relatives (such as *P. virginianum*) grow from similar rhizomes and are difficult to eradicate.
- A. Canada thistle  
 B. Japanese knotweed  
 C. Russian thistle  
 D. Toadflax  
 E. Autumn olive  
 F. None of the Above

5. \_\_\_\_\_ is difficult to control. Its extensive root system has vast nutrient stores that let it recover from control attempts. Combine control methods into a system to achieve best results.
- A. Leafy spurge            D. Toadflax  
 B. Spurge laurel            E. Scotch thistle  
 C. Russian thistle            F. None of the Above
6. As an annual, \_\_\_\_\_ reproduces solely by seed. Seeds generally do not remain viable past one year. Repeated hoeing, tilling, or mowing of young plants will prevent seed production. Hand-pulling (with gloves) can also be effective for small infestations.
- A. Snapdragon            D. Toadflax  
 B. Spurge laurel            E. Autumn olive  
 C. Russian thistle            F. None of the Above
7. \_\_\_\_\_ is a branched, robust biennial (or sometimes annual) that often grows 8 feet or more in height and 6 feet in width. Main stems may be up to 4 inches wide at the base. Stems have vertical rows of prominent, spiny, ribbon-like leaf material or "wings" that extend to the base of the flower heads.
- A. Leafy spurge            D. Toadflax  
 B. Spurge laurel            E. Scotch thistle  
 C. Russian thistle            F. None of the Above
8. \_\_\_\_\_ is an attractive ornamental plant known for its spiraling evergreen leaves and greenish-yellow, bitter-fragrant flowers. Larger patches of this species emit a strong unpleasant odor. Flowering occurs in late winter-early spring, producing clusters of blue berries during the spring.
- A. Snapdragon            D. Toadflax  
 B. Spurge laurel            E. Autumn olive  
 C. Russian thistle            F. None of the Above
9. \_\_\_\_\_ is a perennial with erect, smooth, herbaceous stems that are less than 2 feet tall and emerge in clumps from a spreading root system. Soft, gray-green leaves, which are 1 to 1 1/2 inches long and narrow, are crowded onto each stem.
- A. Leafy spurge            D. Toadflax  
 B. Spurge laurel            E. Scotch thistle  
 C. Russian thistle            F. None of the Above
10. This plant has stems that terminate with clusters of 15 to 20 snapdragon-like flowers that are about 1 inch long and yellow. Gently pinching the sides of a flower opens its 2 lips revealing an orange throat that acts as a guide for insects to nectar produced in the spur. The plant reproduces by seeds and creeping roots.
- A. Snapdragon            D. Toadflax  
 B. Spurge laurel            E. Autumn olive  
 C. Russian thistle            F. None of the Above

### Commonly Found Invasive and/or Noxious Weeds - Topic 3

1. Musk thistle rosettes are usually large and compact with a large, corky taproot that is hollow near the \_\_\_\_\_. Leaves have consistent shape, sometimes expressing a frosted appearance around the leaf margins, and often have a cream-colored midrib.
- A. Rosettes            D. Crown  
 B. Mid-rib            E. Leaves  
 C. Flowers            F. None of the Above

2. Musk thistle flowers and starts to produce seed 45 to 55 days after it bolts. Musk thistle has very large bracts beneath flowers that are armed with sharp spines and shoots beneath flowers are almost devoid of \_\_\_\_\_.

- A. Rosettes
- B. Mid-ribs
- C. Flowers
- D. Spikes
- E. Leaves
- F. None of the Above

3. \_\_\_\_\_ will not tolerate tillage and can be removed easily by severing its root below ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

4. In natural areas where Canada thistle is interspersed with desirable native plants, targeted application of a systemic herbicide such as \_\_\_\_\_, which carries plant toxins to the roots, may be effective.

- A. Triclopyr (e.g., Garlon)
- B. Glyphosate (e.g., Roundup or Rodeo)
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

5. Multiple treatments are necessary every year for several years, making leafy spurge control an extremely expensive undertaking. If left uncontrolled for a single year, \_\_\_\_\_ can re-infest rapidly. Prescribed burning, in conjunction with herbicides, may also be effective.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Leafy spurge
- E. Canada thistle
- F. None of the Above

6. The addition of a non-ionic surfactant at a concentration of 0.5% improves the effectiveness of foliar treatments. \_\_\_\_\_ have been shown to be effective in controlling Chinese lespedeza.

- A. Triclopyr (e.g., Garlon)
- B. Triclopyr and clopyralid
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

7. \_\_\_\_\_ plants grow from four to ten feet high, depending upon conditions, and produce a showy display of magenta-colored flower spikes throughout much of the summer. Flowers have five to seven petals. Mature plants can have from 30 to 50 stems arising from a single rootstock.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

8. \_\_\_\_\_ raises fuel loads, which increases the intensity and spread of a fire, and results in severe damage to native, dry forest species adapted to less extreme fire regimes.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

9. First year \_\_\_\_\_ plants are low-growing rosettes of bluish gray-green, felt-like leaves that range from 4-12 inches in length and 1-5 inches in width.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

## Introduction to Grasses

### Exotic Grass Control

10. Exotic grasses have become one of the most insidious problems in the field of wildlife management, because they can totally dominate pasture and prairie lands once established, having little wildlife value and leaving no room for native plants. Repeated applications of \_\_\_\_\_ are required for control.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Chemical applications
- E. Herbicide(s)
- F. None of the Above

## Herbs and Related Invasive Species Topic 4

1. When glyphosate is applied to susceptible plants, glyphosate blocks EPSP synthase preventing the production of essential amino acids and the plant dies. However, in plants that are Roundup Ready, a modified EPSP synthase is unaffected by glyphosate and allows the plant to continue growing. There is little or no crop injury associated with \_\_\_\_\_ application and Roundup Ready alfalfa.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

2. If the glyphosate application is made after the \_\_\_\_\_, some yield loss may occur due to the competitive effects of the weed on the crop; in other words, the damage has already been done.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

### Glyphosate Stewardship

3. Rotation to non-Roundup Ready crops using \_\_\_\_\_ after Roundup Ready crops is also effective in reducing the potential for glyphosate-resistant weeds.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

4. \_\_\_\_\_ is most commonly used. However, herb Robert often occurs initially as part of a mosaic alongside desirable native species. In these situations, alternative control methods that have the ability to target individual plants can more successfully meet all goals of a project.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

5. Grass Family (Poaceae). Toothache grass is a \_\_\_\_\_.

- A. Winter annual
- B. Summer annual
- C. Biennial grass
- D. Warm-season, perennial bunch grass
- E. Cold season perennial bunch grass
- F. None of the Above

6. \_\_\_\_\_ is a postemergence herbicide that is slowly translocated within the plant. It can effectively control tillered crabgrass with a single application.

- A. Quinclorac
- B. Dithiopyr
- C. Fenoxaprop-p-ethyl
- D. Pendimethalin and phenoxy herbicides
- E. Systemic herbicide
- F. None of the Above

7. \_\_\_\_\_ acts as a preemergence and postemergence herbicide. It provides postemergence control of crabgrass only up to the one-tiller stage of development, but it can be combined with fenoxaprop-p-ethyl when two or more tillers are present.

- A. Quinclorac
- B. Dithiopyr
- C. Fenoxaprop-p-ethyl
- D. Pendimethalin and phenoxy herbicides
- E. Systemic herbicide
- F. None of the Above

8. \_\_\_\_\_ is a postemergence herbicide effective in controlling crabgrass and some broadleaf weeds.

- A. Quinclorac
- B. Dithiopyr
- C. Fenoxaprop-p-ethyl
- D. Pendimethalin and phenoxy herbicides
- E. Systemic herbicide
- F. None of the Above

9. Quinclorac can be mixed with other herbicides, including \_\_\_\_\_, to improve weed control. For best results, apply quinclorac in combination with a methylated seed oil according to directions on the label.

- A. Quinclorac
- B. Dithiopyr
- C. Fenoxaprop-p-ethyl
- D. Pendimethalin and phenoxy herbicides
- E. Systemic herbicide
- F. None of the Above

10. \_\_\_\_\_ leaves, in comparison, are smooth or only sparsely hairy; and the leaf segment is longer, more rounded, and lance-shaped. The somewhat rounded terminal clusters of flower heads of western yarrow are normally white to cream-colored and have an extended bloom period from May to September.

- A. Autumn olive
- B. Canada thistle
- C. Dalmatian toadflax
- D. Eurasian watermilfoil
- E. Common yarrow
- F. None of the Above

## Vine Section Alien Plant Invaders Topic 5

1. Akebia vines may also be dug up, removing as much of the roots as possible. To ensure its complete removal, regular monitoring and repeated cutting, digging or pulling is necessary. For large infestations, use of a labeled systemic herbicide, such as glyphosate (e.g., Roundup) or triclopyr (e.g., Garlon), is probably the most effective method to control akebia. An herbicidal soap, such as \_\_\_\_\_, which provides a burndown of plant tissues, may also provide some control.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Pelargonic acid (e.g., Scythe)
- F. None of the Above

2. Once established, the vine quickly overwhelms and destroys native vegetation by shading out smaller plants and outcompeting native vegetation for water and nutrients. Urban parks, with extensive wooded borders neighboring landscaped residential and private property, are especially vulnerable to invasion by \_\_\_\_\_.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (Celastrus scandens)
- E. Fountain grass
- F. None of the Above

3. Clusters of small greenish flowers emerge from leaf axils, allowing each plant to produce large numbers of seeds. At maturity, globular, green to yellow fruits split open to reveal three red-orange, fleshy arils that contain the seeds. These showy fruits have made \_\_\_\_\_ very popular for use in floral arrangements.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet
- E. Fountain grass
- F. None of the Above



4. A variety of \_\_\_\_\_ are available for management of climbing euonymus. Grubbing, a rather labor intensive method, is effective for small populations or environmentally sensitive areas where herbicides cannot be used.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Mechanical and chemical methods
- F. None of the Above

5. Because English ivy is an evergreen vine, and remains active during the winter, \_\_\_\_\_ can be made to it any time of year as long as temperatures are above 55 or 60°Fahrenheit for a few days.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

6. Fall and winter applications will avoid or minimize impacts to many native plant species. Repeat \_\_\_\_\_ are likely to be needed and follow-up monitoring should be conducted to evaluate the success of treatments.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

7. Several \_\_\_\_\_ (e.g., glyphosate and triclopyr) move through the plant to the roots when applied to the leaves or stems and have been used effectively on Japanese honeysuckle.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

8. Local bird populations are important for dispersal under utility lines, bird feeders, fence lines and other perching locations. Other animals observed eating \_\_\_\_\_ fruits are chipmunks, squirrel and deer.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (Celastrus scandens)
- E. Fountain grass
- F. None of the Above

9. Cut \_\_\_\_\_ can be fed to livestock, burned or enclosed in plastic bags and sent to a landfill. If conducted in the spring, cutting must be repeated as regrowth appears to exhaust the plant's stored carbohydrate reserves.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (Celastrus scandens)
- E. Fountain grass
- F. None of the Above

10. \_\_\_\_\_ is effective at a concentration of 0.5% and is selective to plants in the aster, buckwheat, and pea families. Caution should be taken with chlorpyralid as groundwater pollution through leaching can be a problem with certain soil types. Do not apply spray so heavily that herbicide drips off the leaves.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

## Trees- Alien Plant Invaders Topic 6

1. Establishing a thick cover of trees (preferably native and non-invasive) or grass sod will help shade out and discourage establishment of ailanthus seedlings. Targeting large female trees for control will help reduce spread of \_\_\_\_\_ by seed.

- A. Silk tree(s)
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

2. \_\_\_\_\_ can be controlled using a variety of mechanical and chemical controls. Hand pulling may be effective for young seedlings. Plants should be pulled as soon as they are large enough to grasp.

- A. Silk tree(s)
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

3. Princess tree seedlings and small trees can be controlled by applying a 2% solution of \_\_\_\_\_ or triclopyr (e.g., Garlon) and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

4. Because \_\_\_\_\_ spreads by suckering, resprouts are common after treatment. Cutting is an initial control measure and will require either an herbicidal control or repeated cutting for resprouts.

- A. Mimosa
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

5. Whenever possible, efforts should be taken to prevent the introduction or encroachment of \_\_\_\_\_. For example, recently disturbed beach habitat may be planted with native vegetation to prevent Australian pine from invading.

- A. Silk tree(s)
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

6. Clumps of seedlings suggest dispersal by small mammals. In its native range, \_\_\_\_\_ is pollinated by bees, which are the likely pollinators in Florida.

- A. Silk tree(s)
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

7. \_\_\_\_\_ kills broadleaf (dicotyledonous) plants but causes little or no damage to grasses and is useful for areas where desirable grasses are to be maintained.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

8. Unfortunately, \_\_\_\_\_ seedlings often grow in low litter areas, unsuitable for frequent prescribed fire. In dense stands, seedlings and saplings may be cut and dropped on site, creating fuel for future fires.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

9. \_\_\_\_\_ seedlings appear vulnerable to fire, perhaps due to their poorly established root structure. Fire will top kill a mature plant, but resprouting does occur.
- A. Buckthorn
  - B. Ailanthus
  - C. Carrotwood
  - D. Princess tree(s)
  - E. Australian pine
  - F. None of the Above

10. Uprooting of 1/2 inch diameter seedlings by hand or up to 1 1/2 inch diameter using a weed wrench is effective, but care should be taken to avoid excessive disturbance to the soil, which can release \_\_\_\_\_ seeds stored in the soil.
- A. Buckthorn
  - B. Ailanthus
  - C. Carrotwood
  - D. Princess tree(s)
  - E. Australian pine
  - F. None of the Above

## Weed Management and Control Section Topic 7

1. \_\_\_\_\_ is necessary following mechanical or chemical control. Digging and chopping cause soil disturbance and desired plants need to be reestablished before the invader can get a foothold. The same is true of chemical control, the desired vegetation must be reestablished. Moreover, you must remember that the invader was able to gain a toehold under the management regime that had been in place on that land.
- A. Chemical control
  - B. Environmental and economic problem
  - C. Persistence
  - D. Persistent (long-lasting) pesticides
  - E. Pesticide remains in the environment
  - F. None of the Above

### Cultural Control

2. Controlling weeds on such sites can be futile without \_\_\_\_\_, as weeds will readily re-invade the disturbed area.
- A. Chemical control
  - B. Vegetative restoration
  - C. Persistence
  - D. Persistent (long-lasting) pesticides
  - E. Pesticide remains in the environment
  - F. None of the Above
3. \_\_\_\_\_ are available as concentrated liquids, (2 to 8 lb/gal) which need to be mixed with water before applying; as wettable powders which are from 50 to 100% active ingredient and need to be dispersed in water for uniform application, or as granules which are from 1 to 10% active ingredient and which are applied dry with granular applicators. See the label for all instructions on labeled crops and timings.
- A. Weed control chemicals
  - B. Dithiopyr
  - C. Nonglyphosate herbicides
  - D. Glyphosate (Roundup™)
  - E. Systemic herbicide
  - F. None of the Above

4. Most effective control of \_\_\_\_\_ broadleaf weeds is obtained when applied in early fall (August 15–October 15) or in spring (May 1–June 1). For some weeds, repeated application at 20–30 day intervals may be required for control.
- A. Perennial
  - B. Summer annual(s)
  - C. Biennial(s)
  - D. Summer and winter annual(s)
  - E. Summer annuals (AKA warm season annuals)
  - F. None of the Above

5. \_\_\_\_\_ kill all plants, both desirable and undesirable. These herbicides can be used to spot treat perennial grassy weeds that are not affected by selective herbicides. To spot treat an area, thoroughly wet the weed foliage with herbicide solution.
- A. Triclopyr
  - B. Dithiopyr
  - C. Nonglyphosate herbicides
  - D. Nonselective postemergence herbicides
  - E. Systemic herbicides
  - F. None of the Above

6. \_\_\_\_\_ is referred to as a desiccant because it causes a leaf or an entire plant to dry out quickly. It is used to desiccate potato vines and seed crops, to control flowering of sugarcane, and for industrial and aquatic weed control. It is not residual; that is, it does not leave any trace of herbicide on or in plants, soil, or water.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Diquat dibromide
- F. None of the Above

7. The product Agent Orange, used extensively throughout Vietnam, was about 50% 2,4-D. However, the controversies associated with the use of Agent Orange were associated with a contaminant (\_\_\_\_\_ ) in the 2,4,5-T component of the defoliant.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Dioxin
- F. None of the Above

**Imazapyr** (Trade name Habitat®).

8. Although imazapyr is a \_\_\_\_\_, a good applicator can somewhat selectively remove targeted plants by focusing the spray only on the plants to be removed.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

### **Persistence of Pesticides**

9. Persistence refers to the length of time a pesticide remains in the environment. This depends on how quickly it breaks down (degrades), which is largely a function of its \_\_\_\_\_. Persistence is usually expressed as the "half-life" (T1/2) of a pesticide.

- A. Chemical control
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

10. Pesticides can be degraded by sunlight (photodecomposition), high air or water temperatures (thermal degradation), moisture conditions, biological action (microbial decay), and soil conditions (pH). \_\_\_\_\_ break down slowly and may be more available to aquatic animals.

- A. Persistent (long-lasting) pesticides
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (short-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

## **Introduction to Wetlands Section Topic 8**

### **Filamentous Algae**

1. Unlike microscopic algae, \_\_\_\_\_ are frequently a problem in pond management and are usually visible to the naked eye as a floating mat of thread-like filaments often called "pond moss". They usually begin growth on the pond bottom in shallow water, later float to the surface and may completely cover the pond surface.

- A. Filamentous algae
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

### **Biological Control**

2. Grass carp are not very effective at controlling \_\_\_\_\_, except at very high densities. Grass carp do not control planktonic algae.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

### Economic Importance

3. \_\_\_\_\_ are a severe environmental and economic problem in all of the gulf coast states and in many other areas of the world with a sub-tropical or tropical climate. This species has rapidly spread throughout inland and coastal freshwater bays, lakes, and marshes in the United States and in other countries.

- A. Water lettuce
- B. Big floating bladderwort
- C. Water hyacinths
- D. Alders
- E. Eurasian watermilfoil
- F. None of the Above

4. When big floating bladderwort is flowering it is easily distinguished from its native cousins by large spoke-like floats that radiate out from the base of the flower stalk. During the rest of the year, however, it can be confused with \_\_\_\_\_, both of which are rather robust and can appear almost bushy underwater.

- A. Water lettuce
- B. Big floating bladderwort
- C. Water hyacinths
- D. Common bladderwort
- E. Eurasian watermilfoil
- F. None of the Above

### Control

5. Years of research to find insect biocontrols has resulted in the successful introduction of two insects which are believed to be helpful in keeping water lettuce under maintenance control in many places; however, biocontrol fish which are able to control submersed plants are ineffective against the \_\_\_\_\_.

- A. Floating water lettuce
- B. Big floating bladderwort
- C. Water hyacinths
- D. Algae
- E. Eurasian watermilfoil
- F. None of the Above

6. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Glyphosate herbicides
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Broad spectrum, non-selective herbicides
- E. Systemic herbicides
- F. None of the Above

7. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. \_\_\_\_\_ (see the label) will have to be added to the glyphosate solution for good results.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

8. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of \_\_\_\_\_.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Triclopyr
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

9. \_\_\_\_\_ benefit other plants growing near them by taking nitrogen out of the air and depositing it in the soil in usable form; fallen alder leaves make very rich compost.

- A. Water lettuce
- B. Big floating bladderwort
- C. Water hyacinths
- D. Alders
- E. Eurasian watermilfoil
- F. None of the Above

10. One danger with any chemical control method is the chance of oxygen depletion after the treatment caused by the decomposition of the dead plant material. \_\_\_\_\_ depletions can kill fish in the pond. If the pond is heavily infested with weeds it may be possible (depending on the herbicide chosen) to treat the pond in sections and let each section decompose for about two weeks before treating another section. Aeration, particularly at night, for several days after treatment may help control the oxygen depletion.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

## Submersed (underwater) Aquatic Weed Section Topic 9

1. Renovate is a liquid triclopyr formulation that is effective on \_\_\_\_\_. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

2. A variety of physical, chemical, and biological control methods have been used in attempts to manage infestations of \_\_\_\_\_. Unfortunately, complete eradication is rare.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

3. Navigate and Aqua-Kleen is a granular butoxyethyl ester of 2,4-D and has been effective on Eurasian watermilfoil. \_\_\_\_\_ are systemic herbicides. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. 2,4-D compounds
- F. None of the Above

4. Reward is a liquid diquat formulation that has been effective on Eurasian watermilfoil and is very effective if mixed with a copper compound. It is a contact herbicide. \_\_\_\_\_ act quickly and kill all plants cells that they contact.

- A. Systemic herbicide(s)
- B. Liquid formulation
- C. Liquid diquat formulation
- D. Contact herbicides
- E. Copper
- F. None of the Above

5. Renovate is a \_\_\_\_\_ that is effective on Eurasian watermilfoil. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

6. Aquathol, Aquathol K, and Aquathol Super K are \_\_\_\_\_ and comes in both liquid and granular formulations.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid diquat formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Dipotassium salts of endosulfan
- F. None of the Above

7. Sonar and Avast are fluridone compounds, come in both liquid and granular formulations, and have been effective on Eurasian watermilfoil. These are broad spectrum, systemic herbicides. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid diquat formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. Copper
- F. None of the Above

8. Any aquatic plant identified as \_\_\_\_\_ should be sent to a specialist for positive identification since hydrilla is such a serious threat to fresh water habitats. It is only through early identification and concentrated control methods that there is any hope of eliminating hydrilla. Fishermen or boaters in waters known to have hydrilla should make every effort not to accidentally transport hydrilla from one lake or pond to another.

- A. Water lettuce
- B. Hydrilla
- C. Egeria, elodea, or hydrilla
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

### Pond Water Chemistry

9. The water hardness also should be considered when using herbicides containing copper. Water hardness--Generally, water hardness is a measure of the \_\_\_\_\_ in the water. In hard waters (above 50 parts per million hardness) it may be necessary to apply greater amounts of herbicide in order to achieve control. In soft waters (below 50 parts per million hardness) some herbicides are more toxic to fish and plants.

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

10. Copper--In soft water some heavy metals, especially \_\_\_\_\_, can be toxic to fish. Some herbicides contain copper and should be used with caution in soft water ponds (less than 50 parts per million water hardness).

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

## Aquatic Herbicides and Controls Section Topic 10

1. \_\_\_\_\_ is used as a defoliant for a wide range of crops and as a herbicide for both terrestrial and aquatic weeds.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Endothall
- E. Systemic herbicide
- F. None of the Above

2. Field and laboratory tests show that \_\_\_\_\_ usually remains in the top inch of soil for long periods of time after it is applied.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

3. Glyphosate itself is an acid, but it is commonly used in salt form, most commonly the isopropylamine salt. It may also be available in \_\_\_\_\_. It is generally distributed as water-soluble concentrates and powders.

- A. Glyphosate herbicides
- B. Acidic or trimethylsulfonium salt forms
- C. Nonglyphosate herbicides
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicides
- F. None of the Above

4. Some formulations of \_\_\_\_\_ are highly toxic to fish while others are less so. For example, the LC50 ranges between 1.0 and 100 mg/L in cutthroat trout, depending on the formulation used. Channel catfish had less than 10% mortality when exposed to 10 mg/L for 48 hours.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

5. \_\_\_\_\_ can be effective for spot treatment of Eurasian watermilfoil and is relatively selective to Eurasian watermilfoil when used at the labeled rate.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Triclopyr
- E. Systemic herbicide
- F. None of the Above

6. \_\_\_\_\_ can show good control of submersed plants where there is little water movement and an extended time for the treatment. Its use is most applicable to whole-lake or isolated bay treatments where dilution can be minimized. It is not effective for spot treatments of areas less than five acres.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

7. Most species of algae can be controlled with very low concentrations of \_\_\_\_\_. It is available in crystalline nuggets the size of rock salt or as a finely ground "snow" grade.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Copper sulfate
- E. Cutrine Plus
- F. None of the Above

8. \_\_\_\_\_, under field conditions, is effective in controlling a broad range of algae including Chara, Spirogyra, Cladophora, Vaucheria, Ulothrix, Microcystis, and Oscillatoria. Effective in hard water.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Cutrine Plus
- E. Copper sulfate
- F. None of the Above

9. \_\_\_\_\_ is a concentrated liquid aquatic herbicide effective against a wide variety of submersed, emergent, and floating aquatic plants including duckweed, naiads, and cattails.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

10. \_\_\_\_\_ poses virtually no environmental risk in aquatic applications because the herbicide concentration rapidly decreases as it is absorbed onto soil, vegetation, and organic matter.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Reward
- E. Systemic herbicide
- F. None of the Above



## Invasive Plant Rule Section Topic 11

1. Invasion can be thought of as a process that in our example, a plant must go through to become a successful, yet harmful invader. \_\_\_\_\_ must be overcome for a plant to be considered an invasive weed. Invasive weeds are invasive species.

- A. Population of non-native plants
- B. An invasive species
- C. Several barriers
- D. Geographical barrier
- E. Application of any pesticide
- F. None of the Above

### Large-scale geographical barriers

2. First, a geographical barrier must be overcome, which often occurs as a mountain range, ocean, or similar physical barrier to movement of seeds and other reproductive plant parts. Plants that overcome \_\_\_\_\_ are known as alien plants or alien species.

- A. Population of non-native plant(s)
- B. An invasive species
- C. Non-selective herbicides
- D. Geographical barrier(s)
- E. Application of any pesticide(s)
- F. None of the Above

3. \_\_\_\_\_ are non-native plants and alien species are non-native species. Therefore, non-native plants are those that occur outside their natural range boundaries, and this most often is mediated by humans either deliberately or unintentionally.

- A. Population of non-native plants
- B. An invasive species
- C. Non-native plant
- D. Noxious weed(s)
- E. Alien plants
- F. None of the Above

### Survival barriers

4. The second set of obstacles that a \_\_\_\_\_ must overcome is barriers to germination and survival in its new location. These typically are environmental barriers such as adequate moisture availability to allow successful germination and survival of seedlings that will continue to grow to maturity.

- A. Population of non-native plants
- B. An invasive species
- C. Non-native plant
- D. Noxious weed(s)
- E. Alien plants
- F. None of the Above

5. Other physical barriers might be \_\_\_\_\_, or competition for resources from neighboring plants.

- A. pH, nutrient availability
- B. Several barriers
- C. Altering physical processes
- D. Noxious weed
- E. Pesticide residues
- F. None of the Above

### Establishment barriers

6. The third obstacle that a non-native plant must overcome to be considered an invasive weed, is to form a population that is self-sustaining and does not need re-introduction to maintain a population base such that it continues to survive and thrive in its new environment. Once this occurs, this \_\_\_\_\_ is considered to be established. Environmental barriers to survival and establishment are similar.

- A. Population of non-native plants
- B. An invasive species
- C. Non-native plant
- D. Noxious weed(s)
- E. Alien plants
- F. None of the Above

### Dispersal and spread barriers

7. Established non-native plants must overcome barriers to dispersal and spread from their site of establishment to be considered invasive plants. Additionally, the rate of spread must be relatively fast. However, this movement or spread alone does not necessarily make this non-native plant an invasive weed or \_\_\_\_\_.

- A. Population of non-native plants
- B. Invasive species
- C. Non-native plant
- D. Noxious weed(s)
- E. Alien plant
- F. None of the Above

### Harm and impact

8. Finally, a plant is deemed to be invasive if it causes negative environmental, economic, or human health effects, which outweigh any beneficial effects. For example, yellow starthistle is a source of nectar for bee producers. But the displacement of native and other desirable plant species caused by yellow starthistle leads to dramatically decreased forage for wildlife and livestock, which severely disrupts the profitability of associated businesses. \_\_\_\_\_ greatly overshadow the positive effects and thus, define harm caused by yellow starthistle and explain why it is considered an invasive species.

- A. Population of non-native plants
- B. An invasive species
- C. Non-selective herbicides
- D. These negative effects
- E. Application of any pesticide
- F. None of the Above

### California

9. Invasive plants are one of the most serious environmental issues facing California. They disrupt ecosystems by altering physical processes, displacing native plants, and degrading wildlife habitat. The California Invasive Plant Inventory is a vital resource for those working to protect the state's natural areas. The Inventory summarizes the impacts, potential for spread, and distribution of more than 200 \_\_\_\_\_ that invade wildlands in California.

- A. Population of non-native plants
- B. Invasive species
- C. Non-native plant(s)
- D. Noxious weed(s)
- E. Alien plant(s)
- F. None of the Above

### Federal Weed Rule 7 CFR 360.100 Definitions

#### 360.200 Designation of noxious weeds.

10. Pursuant to the provisions of section 10 of the Federal Noxious Weed Act of 1974 (7 U.S.C. 2809) the Secretary of Agriculture, after publication of the required notice of proposal and after public hearing on the proposal when requested by any interested person, has determined based upon the information received at any such hearing and other information available to the Secretary, that the following plants are within the definition of a "\_\_\_\_\_ " in section 3(c) of the Act (7 U.S.C. 2802(c)) and that their dissemination in the United States may reasonably be expected to have, to a serious degree, an effect specified in said section 3(c) of the Act:

- A. Population of non-native plants
- B. Invasive species
- C. Non-native plant(s)
- D. Noxious weed(s)
- E. Alien plant(s)
- F. None of the Above

**If you are a California DPR student, we will require a photocopy of your driver's license.**

Fax Number (928) 272-0747 Always call us after faxing the paperwork to ensure that we've received it. Allow two weeks for processing and for the proper DPR forms to be sent back to you. If you need this course graded and your certificate sooner, add a \$50.00 rush fee. This may not include postage charges.

## Invasive Plant Identification CEU Conventional Assignment #2

You will have 90 days from the start of this course to have successfully completed this CEU assignment with a score of 70%. You may e-mail the answers to TLC, info@tlch2o.com, you can also find a copy of this assignment in Word on the Assignment Page on TLC's website or fax the answers to TLC (928) 468-0675. Write your answers on the Answer Key found in the front of first assignment.

**Write your answers on the Answer Key found in the front section of this assignment.**

### Weed Identification Section Topic 1

(s) Means the answer can be plural or singular.

1. \_\_\_\_\_ weeds germinate from seed, grow, flower, and produce seed in less than one year.

- A. Winter annual(s)
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

2. \_\_\_\_\_ germinate in the fall, overwinter as seedlings or small rosettes and mature, set seed and die the following spring or early summer.

- A. Winter annual(s)
- B. Perennial
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

#### Understanding Weed Terms

3. The key is to use pesticides in a way that complements rather than hinders \_\_\_\_\_ in the strategy and which also limits negative environmental effects.

- A. Other elements
- B. Ecovar development process
- C. Minimum levels of pesticide
- D. Direct habitat destruction
- E. Negative environmental effects
- F. None of the Above

4. \_\_\_\_\_ are maintained via controlled pollination or vegetative means, so that cultivar characteristics are passed to ensuing generations.

- A. Cultivars
- B. Ecovar development process(s)
- C. Minimum levels of pesticide(s)
- D. Direct habitat destruction
- E. Negative environmental effect(s)
- F. None of the Above

5. An ecovar is an intermediate step between a wild-growing plant and a \_\_\_\_\_.

- A. Cultivar
- B. Ecovar development process
- C. Minimum levels of pesticide
- D. Direct habitat destruction
- E. Negative environmental effects
- F. None of the Above

#### Importance of Native Plants

6. Invasions of non-native plants are the \_\_\_\_\_ after direct habitat destruction.

- A. Genetic diversity
- B. Ecovar development process
- C. Minimum levels of pesticide
- D. Direct habitat destruction
- E. Negative environmental effects
- F. None of the Above

7. Puncture vine is a prostrate, mat-forming \_\_\_\_\_. It has small leaflets and small yellow flowers with 5 petals.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

8. Curly dock is a \_\_\_\_\_ weed in the buckwheat family. Fairly pleasant tasting, the leaves are very rich in vitamins, especially vitamins A and C, and can be eaten raw or cooked.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

9. The roasted seed has been used as a coffee substitute. It is also a very important food plant for the caterpillars of many butterflies. In the spring, basal \_\_\_\_\_ emerge from a stout taproot. These elongated leaves have wavy margins, thus the name "curly" dock. In summer, the plant has reddish, rigid stems, 2-4 feet tall. Flower stems have greenish flowers.

- A. Rosettes
- B. Mid-ribs
- C. Flowers
- D. Spikes
- E. Leaves
- F. None of the Above

10. Milkweed plants, members of the Asclepias family, are the only host plant for the monarch and queen butterflies. The adult females seek out these plants on which they lay their eggs. The caterpillars that hatch will remain on the plants and eat the leaves until they enter the pupal stage, then emerge as adult butterflies. It is a \_\_\_\_\_ herb with long-spreading rhizomes.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

## Invasive Plant Species Introduction Topic 2

### Federally Listed Invasive Plant Species

1. \_\_\_\_\_ has elliptic to lanceolate leaves, its branches are usually thorny, and its fruit is yellow, dry and mealy.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

2. Combining control methods is the best form of \_\_\_\_\_ management. Persistence is imperative so the weed is continually stressed, forcing it to exhaust root nutrient stores and eventually die.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

3. \_\_\_\_\_ was easy to establish and homesteaders liberally landscaped their properties with this drought resistant plant, continually spreading it in their migration to the Western frontier. Also, burial sites were often adorned with toadflax to give everlasting beauty and tranquility. Their legacy has prevailed, proving to be notorious in nature.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

4. The broad and pointed \_\_\_\_\_ leaves can be mistaken for Broadleaf dock (*Rumex obtusifolia*), but docks lack rhizomes and the tall, spreading habit of Japanese knotweed. Other less invasive relatives (such as *P. virginianum*) grow from similar rhizomes and are difficult to eradicate.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

5. \_\_\_\_\_ is difficult to control. Its extensive root system has vast nutrient stores that let it recover from control attempts. Combine control methods into a system to achieve best results.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

6. As an annual, \_\_\_\_\_ reproduces solely by seed. Seeds generally do not remain viable past one year. Repeated hoeing, tilling, or mowing of young plants will prevent seed production. Hand-pulling (with gloves) can also be effective for small infestations.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

7. \_\_\_\_\_ is a branched, robust biennial (or sometimes annual) that often grows 8 feet or more in height and 6 feet in width. Main stems may be up to 4 inches wide at the base. Stems have vertical rows of prominent, spiny, ribbon-like leaf material or "wings" that extend to the base of the flower heads.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

8. \_\_\_\_\_ is an attractive ornamental plant known for its spiraling evergreen leaves and greenish-yellow, bitter-fragrant flowers. Larger patches of this species emit a strong unpleasant odor. Flowering occurs in late winter-early spring, producing clusters of blue berries during the spring.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

9. \_\_\_\_\_ is a perennial with erect, smooth, herbaceous stems that are less than 2 feet tall and emerge in clumps from a spreading root system. Soft, gray-green leaves, which are 1 to 1 1/2 inches long and narrow, are crowded onto each stem.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

10. This plant has stems that terminate with clusters of 15 to 20 snapdragon-like flowers that are about 1 inch long and yellow. Gently pinching the sides of a flower opens its 2 lips revealing an orange throat that acts as a guide for insects to nectar produced in the spur. The plant reproduces by seeds and creeping roots.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

## Commonly Found Invasive and/or Noxious Weeds - Topic 3

1. Musk thistle rosettes are usually large and compact with a large, corky taproot that is hollow near the \_\_\_\_\_. Leaves have consistent shape, sometimes expressing a frosted appearance around the leaf margins, and often have a cream-colored midrib.  
A. Rosettes                      D. Crown  
B. Mid-rib                        E. Leaves  
C. Flowers                        F. None of the Above
2. Musk thistle flowers and starts to produce seed 45 to 55 days after it bolts. Musk thistle has very large bracts beneath flowers that are armed with sharp spines and shoots beneath flowers are almost devoid of \_\_\_\_\_.  
A. Rosettes                      D. Spikes  
B. Mid-ribs                       E. Leaves  
C. Flowers                        F. None of the Above
3. \_\_\_\_\_ will not tolerate tillage and can be removed easily by severing its root below ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed.  
A. Mullein                        D. Chinese lespedeza  
B. Fountain grass               E. Canada thistle  
C. Loosestrife                  F. None of the Above
4. In natural areas where Canada thistle is interspersed with desirable native plants, targeted application of a systemic herbicide such as \_\_\_\_\_, which carries plant toxins to the roots, may be effective.  
A. Triclopyr (e.g., Garlon)                      D. Herbicide applications  
B. Glyphosate (e.g., Roundup or Rodeo) E. Systemic herbicide(s)  
C. Chlorpyralid (e.g. Transline)                F. None of the Above
5. Multiple treatments are necessary every year for several years, making leafy spurge control an extremely expensive undertaking. If left uncontrolled for a single year, \_\_\_\_\_ can re-infest rapidly. Prescribed burning, in conjunction with herbicides, may also be effective.  
A. Mullein                        D. Leafy spurge  
B. Fountain grass               E. Canada thistle  
C. Loosestrife                  F. None of the Above
6. The addition of a non-ionic surfactant at a concentration of 0.5% improves the effectiveness of foliar treatments. \_\_\_\_\_ have been shown to be effective in controlling Chinese lespedeza.  
A. Triclopyr (e.g., Garlon)                      D. Herbicide applications  
B. Triclopyr and clopyralid                    E. Systemic herbicide(s)  
C. Chlorpyralid (e.g. Transline)                F. None of the Above
7. \_\_\_\_\_ plants grow from four to ten feet high, depending upon conditions, and produce a showy display of magenta-colored flower spikes throughout much of the summer. Flowers have five to seven petals. Mature plants can have from 30 to 50 stems arising from a single rootstock.  
A. Mullein                        D. Chinese lespedeza  
B. Fountain grass               E. Canada thistle  
C. Loosestrife                  F. None of the Above

8. \_\_\_\_\_ raises fuel loads, which increases the intensity and spread of a fire, and results in severe damage to native, dry forest species adapted to less extreme fire regimes.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

9. First year \_\_\_\_\_ plants are low-growing rosettes of bluish gray-green, felt-like leaves that range from 4-12 inches in length and 1-5 inches in width.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

## Introduction to Grasses

### Exotic Grass Control

10. Exotic grasses have become one of the most insidious problems in the field of wildlife management, because they can totally dominate pasture and prairie lands once established, having little wildlife value and leaving no room for native plants. Repeated applications of \_\_\_\_\_ are required for control.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Chemical applications
- E. Herbicide(s)
- F. None of the Above

## Herbs and Related Invasive Species Topic 4

1. When glyphosate is applied to susceptible plants, glyphosate blocks EPSP synthase preventing the production of essential amino acids and the plant dies. However, in plants that are Roundup Ready, a modified EPSP synthase is unaffected by glyphosate and allows the plant to continue growing. There is little or no crop injury associated with \_\_\_\_\_ application and Roundup Ready alfalfa.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

2. If the glyphosate application is made after the \_\_\_\_\_, some yield loss may occur due to the competitive effects of the weed on the crop; in other words, the damage has already been done.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

### Glyphosate Stewardship

3. Rotation to non-Roundup Ready crops using \_\_\_\_\_ after Roundup Ready crops is also effective in reducing the potential for glyphosate-resistant weeds.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

4. \_\_\_\_\_ is most commonly used. However, herb Robert often occurs initially as part of a mosaic alongside desirable native species. In these situations, alternative control methods that have the ability to target individual plants can more successfully meet all goals of a project.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

5. Grass Family (Poaceae). Toothache grass is a\_\_\_\_\_.
- A. Winter annual            D. Warm-season, perennial bunch grass  
 B. Summer annual        E. Cold season perennial bunch grass  
 C. Biennial grass        F. None of the Above
6. \_\_\_\_\_ is a postemergence herbicide that is slowly translocated within the plant. It can effectively control tillered crabgrass with a single application.
- A. Quinclorac                    D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                    E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl        F. None of the Above
7. \_\_\_\_\_ acts as a preemergence and postemergence herbicide. It provides postemergence control of crabgrass only up to the one-tiller stage of development, but it can be combined with fenoxaprop-p-ethyl when two or more tillers are present.
- A. Quinclorac                    D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                    E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl        F. None of the Above
8. \_\_\_\_\_ is a postemergence herbicide effective in controlling crabgrass and some broadleaf weeds.
- A. Quinclorac                    D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                    E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl        F. None of the Above
9. Quinclorac can be mixed with other herbicides, including\_\_\_\_\_, to improve weed control. For best results, apply quinclorac in combination with a methylated seed oil according to directions on the label.
- A. Quinclorac                    D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                    E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl        F. None of the Above
10. \_\_\_\_\_ leaves, in comparison, are smooth or only sparsely hairy; and the leaf segment is longer, more rounded, and lance-shaped. The somewhat rounded terminal clusters of flower heads of western yarrow are normally white to cream-colored and have an extended bloom period from May to September.
- A. Autumn olive                D. Eurasian watermilfoil  
 B. Canada thistle              E. Common yarrow  
 C. Dalmatian toadflax        F. None of the Above

## Vine Section Alien Plant Invaders Topic 5

1. Akebia vines may also be dug up, removing as much of the roots as possible. To ensure its complete removal, regular monitoring and repeated cutting, digging or pulling is necessary. For large infestations, use of a labeled systemic herbicide, such as glyphosate (e.g., Roundup) or triclopyr (e.g., Garlon), is probably the most effective method to control akebia. An herbicidal soap, such as\_\_\_\_\_, which provides a burndown of plant tissues, may also provide some control.
- A. Triclopyr (e.g., Garlon)                    D. Herbicide applications  
 B. Dithiopyr                                    E. Pelargonic acid (e.g., Scythe)  
 C. Chlorpyralid (e.g. Transline)            F. None of the Above



2. Once established, the vine quickly overwhelms and destroys native vegetation by shading out smaller plants and outcompeting native vegetation for water and nutrients. Urban parks, with extensive wooded borders neighboring landscaped residential and private property, are especially vulnerable to invasion by \_\_\_\_\_.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

3. Clusters of small greenish flowers emerge from leaf axils, allowing each plant to produce large numbers of seeds. At maturity, globular, green to yellow fruits split open to reveal three red-orange, fleshy arils that contain the seeds. These showy fruits have made \_\_\_\_\_ very popular for use in floral arrangements.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet
- E. Fountain grass
- F. None of the Above

4. A variety of \_\_\_\_\_ are available for management of climbing euonymus. Grubbing, a rather labor intensive method, is effective for small populations or environmentally sensitive areas where herbicides cannot be used.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Mechanical and chemical methods
- F. None of the Above

5. Because English ivy is an evergreen vine, and remains active during the winter, \_\_\_\_\_ can be made to it any time of year as long as temperatures are above 55 or 60°Fahrenheit for a few days.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

6. Fall and winter applications will avoid or minimize impacts to many native plant species. Repeat \_\_\_\_\_ are likely to be needed and follow-up monitoring should be conducted to evaluate the success of treatments.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

7. Several \_\_\_\_\_ (e.g., glyphosate and triclopyr) move through the plant to the roots when applied to the leaves or stems and have been used effectively on Japanese honeysuckle.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

8. Local bird populations are important for dispersal under utility lines, bird feeders, fence lines and other perching locations. Other animals observed eating \_\_\_\_\_ fruits are chipmunks, squirrel and deer.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

9. Cut \_\_\_\_\_ can be fed to livestock, burned or enclosed in plastic bags and sent to a landfill. If conducted in the spring, cutting must be repeated as regrowth appears to exhaust the plant's stored carbohydrate reserves.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

10. \_\_\_\_\_ is effective at a concentration of 0.5% and is selective to plants in the aster, buckwheat, and pea families. Caution should be taken with chlorpyralid as groundwater pollution through leaching can be a problem with certain soil types. Do not apply spray so heavily that herbicide drips off the leaves.
- |                                  |                           |
|----------------------------------|---------------------------|
| A. Triclopyr (e.g., Garlon)      | D. Herbicide applications |
| B. Dithiopyr                     | E. Systemic herbicide(s)  |
| C. Chlorpyralid (e.g. Transline) | F. None of the Above      |

## Trees- Alien Plant Invaders Topic 6

1. Targeting large female trees for control will help reduce spread of \_\_\_\_\_ by seed.
- |                 |                      |
|-----------------|----------------------|
| A. Silk tree(s) | D. Princess tree(s)  |
| B. Ailanthus    | E. Australian pine   |
| C. Carrotwood   | F. None of the Above |
2. \_\_\_\_\_ can be controlled using a variety of mechanical and chemical controls. Hand pulling may be effective for young seedlings. Plants should be pulled as soon as they are large enough to grasp.
- |                 |                      |
|-----------------|----------------------|
| A. Silk tree(s) | D. Princess tree(s)  |
| B. Ailanthus    | E. Australian pine   |
| C. Carrotwood   | F. None of the Above |
3. Princess tree seedlings and small trees can be controlled by applying a 2% solution of \_\_\_\_\_ or triclopyr (e.g., Garlon) and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.
- |                             |                          |
|-----------------------------|--------------------------|
| A. EPSP synthase            | D. Glyphosate (Roundup™) |
| B. Dithiopyr                | E. Systemic herbicide    |
| C. Nonglyphosate herbicides | F. None of the Above     |
4. Because \_\_\_\_\_ spreads by suckering, resprouts are common after treatment. Cutting is an initial control measure and will require either an herbicidal control or repeated cutting for resprouts.
- |               |                      |
|---------------|----------------------|
| A. Mimosa     | D. Princess tree(s)  |
| B. Ailanthus  | E. Australian pine   |
| C. Carrotwood | F. None of the Above |
5. Whenever possible, efforts should be taken to prevent the introduction or encroachment of \_\_\_\_\_. For example, recently disturbed beach habitat may be planted with native vegetation to prevent Australian pine from invading.
- |                 |                      |
|-----------------|----------------------|
| A. Silk tree(s) | D. Princess tree(s)  |
| B. Ailanthus    | E. Australian pine   |
| C. Carrotwood   | F. None of the Above |
6. Clumps of seedlings suggest dispersal by small mammals. In its native range, \_\_\_\_\_ is pollinated by bees, which are the likely pollinators in Florida.
- |                 |                      |
|-----------------|----------------------|
| A. Silk tree(s) | D. Princess tree(s)  |
| B. Ailanthus    | E. Australian pine   |
| C. Carrotwood   | F. None of the Above |
7. \_\_\_\_\_ kills broadleaf (dicotyledonous) plants but causes little or no damage to grasses and is useful for areas where desirable grasses are to be maintained.
- |                             |                          |
|-----------------------------|--------------------------|
| A. Triclopyr                | D. Glyphosate (Roundup™) |
| B. Dithiopyr                | E. Systemic herbicide    |
| C. Nonglyphosate herbicides | F. None of the Above     |

8. Unfortunately, \_\_\_\_\_ seedlings often grow in low litter areas, unsuitable for frequent prescribed fire. In dense stands, seedlings and saplings may be cut and dropped on site, creating fuel for future fires.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

9. \_\_\_\_\_ seedlings appear vulnerable to fire, perhaps due to their poorly established root structure. Fire will top kill a mature plant, but resprouting does occur.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

10. Uprooting of 1/2 inch diameter seedlings by hand or up to 1 1/2 inch diameter using a weed wrench is effective, but care should be taken to avoid excessive disturbance to the soil, which can release \_\_\_\_\_ seeds stored in the soil.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

## Weed Management and Control Section Topic 7

1. \_\_\_\_\_ is necessary following mechanical or chemical control. Digging and chopping cause soil disturbance and desired plants need to be reestablished before the invader can get a foothold. The same is true of chemical control, the desired vegetation must be reestablished. Moreover, you must remember that the invader was able to gain a toehold under the management regime that had been in place on that land.

- A. Chemical control
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

### Cultural Control

2. Controlling weeds on such sites can be futile without \_\_\_\_\_, as weeds will readily re-invade the disturbed area.

- A. Chemical control
- B. Vegetative restoration
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

3. \_\_\_\_\_ are available as concentrated liquids, (2 to 8 lb/gal) which need to be mixed with water before applying; as wettable powders which are from 50 to 100% active ingredient and need to be dispersed in water for uniform application, or as granules which are from 1 to 10% active ingredient and which are applied dry with granular applicators. See the label for all instructions on labeled crops and timings.

- A. Weed control chemicals
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

4. Most effective control of \_\_\_\_\_ broadleaf weeds is obtained when applied in early fall (August 15–October 15) or in spring (May 1–June 1). For some weeds, repeated application at 20–30 day intervals may be required for control.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Summer annuals (AKA warm season annuals)
- F. None of the Above

5. \_\_\_\_\_ kill all plants, both desirable and undesirable. These herbicides can be used to spot treat perennial grassy weeds that are not affected by selective herbicides. To spot treat an area, thoroughly wet the weed foliage with herbicide solution.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Nonselective postemergence herbicides
- E. Systemic herbicides
- F. None of the Above

6. \_\_\_\_\_ is referred to as a desiccant because it causes a leaf or an entire plant to dry out quickly. It is used to desiccate potato vines and seed crops, to control flowering of sugarcane, and for industrial and aquatic weed control. It is not residual; that is, it does not leave any trace of herbicide on or in plants, soil, or water.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Diquat dibromide
- F. None of the Above

7. The product Agent Orange, used extensively throughout Vietnam, was about 50% 2,4-D. However, the controversies associated with the use of Agent Orange were associated with a contaminant (\_\_\_\_\_ ) in the 2,4,5-T component of the defoliant.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Dioxin
- F. None of the Above

**Imazapyr** (Trade name Habitat®).

8. Although imazapyr is a \_\_\_\_\_, a good applicator can somewhat selectively remove targeted plants by focusing the spray only on the plants to be removed.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

### **Persistence of Pesticides**

9. Persistence refers to the length of time a pesticide remains in the environment. This depends on how quickly it breaks down (degrades), which is largely a function of its \_\_\_\_\_. Persistence is usually expressed as the "half-life" (T<sub>1/2</sub>) of a pesticide.

- A. Chemical control
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

10. Pesticides can be degraded by sunlight (photodecomposition), high air or water temperatures (thermal degradation), moisture conditions, biological action (microbial decay), and soil conditions (pH). \_\_\_\_\_ break down slowly and may be more available to aquatic animals.

- A. Persistent (long-lasting) pesticides
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (short-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

## **Introduction to Wetlands Section Topic 8**

### **Filamentous Algae**

1. Unlike microscopic algae, \_\_\_\_\_ are frequently a problem in pond management and are usually visible to the naked eye as a floating mat of thread-like filaments often called "pond moss". They usually begin growth on the pond bottom in shallow water, later float to the surface and may completely cover the pond surface.

- A. Filamentous algae
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

### Biological Control

2. Grass carp are not very effective at controlling \_\_\_\_\_, except at very high densities. Grass carp do not control planktonic algae.
- A. Water lettuce
  - B. Hydrilla
  - C. Water hyacinths
  - D. Parrotfeather
  - E. Eurasian watermilfoil
  - F. None of the Above

### Economic Importance

3. \_\_\_\_\_ are a severe environmental and economic problem in all of the gulf coast states and in many other areas of the world with a sub-tropical or tropical climate. This species has rapidly spread throughout inland and coastal freshwater bays, lakes, and marshes in the United States and in other countries.
- A. Water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Alders
  - E. Eurasian watermilfoil
  - F. None of the Above
4. When big floating bladderwort is flowering it is easily distinguished from its native cousins by large spoke-like floats that radiate out from the base of the flower stalk. During the rest of the year, however, it can be confused with \_\_\_\_\_, both of which are rather robust and can appear almost bushy underwater.
- A. Water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Common bladderwort
  - E. Eurasian watermilfoil
  - F. None of the Above

### Control

5. Years of research to find insect biocontrols has resulted in the successful introduction of two insects which are believed to be helpful in keeping water lettuce under maintenance control in many places; however, biocontrol fish which are able to control submersed plants are ineffective against the \_\_\_\_\_.
- A. Floating water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Algae
  - E. Eurasian watermilfoil
  - F. None of the Above
6. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.
- A. Glyphosate herbicides
  - B. Dithiopyr
  - C. Nonglyphosate herbicides
  - D. Broad spectrum, non-selective herbicides
  - E. Systemic herbicides
  - F. None of the Above
7. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. \_\_\_\_\_ (see the label) will have to be added to the glyphosate solution for good results.
- A. Glyphosate herbicide
  - B. Dithiopyr
  - C. Nonglyphosate herbicide
  - D. Broad spectrum, non-selective herbicide
  - E. Systemic herbicide
  - F. None of the Above
8. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of \_\_\_\_\_.
- A. Glyphosate herbicide
  - B. Dithiopyr
  - C. Triclopyr
  - D. Broad spectrum, non-selective herbicide
  - E. Systemic herbicide
  - F. None of the Above

9. \_\_\_\_\_ benefit other plants growing near them by taking nitrogen out of the air and depositing it in the soil in usable form; fallen alder leaves make very rich compost.

- A. Water lettuce
- B. Big floating bladderwort
- C. Water hyacinths
- D. Alders
- E. Eurasian watermilfoil
- F. None of the Above

10. One danger with any chemical control method is the chance of oxygen depletion after the treatment caused by the decomposition of the dead plant material. \_\_\_\_\_ depletions can kill fish in the pond. If the pond is heavily infested with weeds it may be possible (depending on the herbicide chosen) to treat the pond in sections and let each section decompose for about two weeks before treating another section. Aeration, particularly at night, for several days after treatment may help control the oxygen depletion.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

## Submersed (underwater) Aquatic Weed Section Topic 9

1. Renovate is a liquid triclopyr formulation that is effective on \_\_\_\_\_. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

2. A variety of physical, chemical, and biological control methods have been used in attempts to manage infestations of \_\_\_\_\_. Unfortunately, complete eradication is rare.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

3. Navigate and Aqua-Kleen is a granular butoxyethyl ester of 2,4-D and has been effective on Eurasian watermilfoil. \_\_\_\_\_ are systemic herbicides. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. 2,4-D compounds
- F. None of the Above

4. Reward is a liquid diquat formulation that has been effective on Eurasian watermilfoil and is very effective if mixed with a copper compound. It is a contact herbicide. \_\_\_\_\_ act quickly and kill all plants cells that they contact.

- A. Systemic herbicide(s)
- B. Liquid formulation
- C. Liquid diquat formulation
- D. Contact herbicides
- E. Copper
- F. None of the Above

5. Renovate is a \_\_\_\_\_ that is effective on Eurasian watermilfoil. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Lliquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

6. Aquathol, Aquathol K, and Aquathol Super K are \_\_\_\_\_ and comes in both liquid and granular formulations. These endothall products have been effective on Eurasian watermilfoil and can be mixed with copper compounds for additional effectiveness. Contact herbicides act quickly and kill all plant cells that they contact.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid diquat formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Dipotassium salts of endothall
- F. None of the Above

7. Sonar and Avast are fluridone compounds, come in both liquid and granular formulations, and have been effective on Eurasian watermilfoil. These are broad spectrum, systemic herbicides. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid diquat formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. Copper
- F. None of the Above

8. Any aquatic plant identified as \_\_\_\_\_ should be sent to a specialist for positive identification since hydrilla is such a serious threat to fresh water habitats. It is only through early identification and concentrated control methods that there is any hope of eliminating hydrilla. Fishermen or boaters in waters known to have hydrilla should make every effort not to accidentally transport hydrilla from one lake or pond to another.

- A. Water lettuce
- B. Hydrilla
- C. Egeria, elodea, or hydrilla
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

### **Pond Water Chemistry**

9. The water hardness also should be considered when using herbicides containing copper. Water hardness--Generally, water hardness is a measure of the \_\_\_\_\_ in the water. In hard waters (above 50 parts per million hardness) it may be necessary to apply greater amounts of herbicide in order to achieve control. In soft waters (below 50 parts per million hardness) some herbicides are more toxic to fish and plants.

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

10. Copper--In soft water some heavy metals, especially \_\_\_\_\_, can be toxic to fish. Some herbicides contain copper and should be used with caution in soft water ponds (less than 50 parts per million water hardness).

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

## **Aquatic Herbicides and Controls Section Topic 10**

1. \_\_\_\_\_ is used as a defoliant for a wide range of crops and as a herbicide for both terrestrial and aquatic weeds.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Endothall
- E. Systemic herbicide
- F. None of the Above

2. Field and laboratory tests show that \_\_\_\_\_ usually remains in the top inch of soil for long periods of time after it is applied.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

3. Glyphosate itself is an acid, but it is commonly used in salt form, most commonly the isopropylamine salt. It may also be available in \_\_\_\_\_. It is generally distributed as water-soluble concentrates and powders.

- A. Glyphosate herbicides
- B. Acidic or trimethylsulfonium salt forms
- C. Nonglyphosate herbicides
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicides
- F. None of the Above

4. Some formulations of \_\_\_\_\_ are highly toxic to fish while others are less so. For example, the LC50 ranges between 1.0 and 100 mg/L in cutthroat trout, depending on the formulation used. Channel catfish had less than 10% mortality when exposed to 10 mg/L for 48 hours.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

5. \_\_\_\_\_ can be effective for spot treatment of Eurasian watermilfoil and is relatively selective to Eurasian watermilfoil when used at the labeled rate.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Triclopyr
- E. Systemic herbicide
- F. None of the Above

6. \_\_\_\_\_ can show good control of submersed plants where there is little water movement and an extended time for the treatment. Its use is most applicable to whole-lake or isolated bay treatments where dilution can be minimized. It is not effective for spot treatments of areas less than five acres.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

7. Most species of algae can be controlled with very low concentrations of \_\_\_\_\_. It is available in crystalline nuggets the size of rock salt or as a finely ground "snow" grade.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Copper sulfate
- E. Cutrine Plus
- F. None of the Above

8. A concentrated granular herbicide effective against a broad range of aquatic plants with a wide margin of safety to fish and other aquatic life. \_\_\_\_\_ are manufactured in a manner which provides an essentially dust free material for easier application.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

9. \_\_\_\_\_ is a concentrated liquid aquatic herbicide effective against a wide variety of submersed, emergent, and floating aquatic plants including duckweed, naiads, and cattails.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

10. \_\_\_\_\_ poses virtually no environmental risk in aquatic applications because the herbicide concentration rapidly decreases as it is absorbed onto soil, vegetation, and organic matter.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Reward
- E. Systemic herbicide
- F. None of the Above



## Invasive Plant Rule Section Topic 11

1. Invasion can be thought of as a process that in our example, a plant must go through to become a successful, yet harmful invader. \_\_\_\_\_ must be overcome for a plant to be considered an invasive weed. Invasive weeds are invasive species.

- A. Population of non-native plants
- B. An invasive species
- C. Several barriers
- D. Geographical barrier
- E. Application of any pesticide
- F. None of the Above

2. \_\_\_\_\_ are non-native plants and alien species are non-native species. Therefore, non-native plants are those that occur outside their natural range boundaries, and this most often is mediated by humans either deliberately or unintentionally.

- A. Population of non-native plants
- B. An invasive species
- C. Non-native plant
- D. Noxious weed(s)
- E. Alien plants
- F. None of the Above

3. Other physical barriers might be \_\_\_\_\_, or competition for resources from neighboring plants.

- A. pH, nutrient availability
- B. Several barriers
- C. Altering physical processes
- D. Noxious weed
- E. Pesticide residues
- F. None of the Above

### Dispersal and spread barriers

4. Established non-native plants must overcome barriers to dispersal and spread from their site of establishment to be considered invasive plants. Additionally, the rate of spread must be relatively fast. However, this movement or spread alone does not necessarily make this non-native plant an invasive weed or \_\_\_\_\_.

- A. Population of non-native plants
- B. Invasive species
- C. Non-native plant
- D. Noxious weed(s)
- E. Alien plant
- F. None of the Above

### California

5. Invasive plants are one of the most serious environmental issues facing California. They disrupt ecosystems by altering physical processes, displacing native plants, and degrading wildlife habitat. The California Invasive Plant Inventory is a vital resource for those working to protect the state's natural areas. The Inventory summarizes the impacts, potential for spread, and distribution of more than 200 \_\_\_\_\_ that invade wildlands in California.

- A. Population of non-native plants
- B. Invasive species
- C. Non-native plant(s)
- D. Noxious weed(s)
- E. Alien plant(s)
- F. None of the Above

### Herbicide and Insecticide Safety Precautions

6. The Federal Environmental Pesticide Control Act of 1972 in part prohibits the application of any pesticide in a manner inconsistent with its labeling. This means that a pesticide cannot be used unless it is registered for the specific pest. Consequently, \_\_\_\_\_ formerly used by homeowners and pesticide applicators can no longer be used legally.

- A. Ester(s)
- B. 2,4 D
- C. Insecticide(s)
- D. 2,4-D, 2,4,5-T, 2,4-DB, 2,4,5-TP (Silvex) and MCPA
- E. Non-selective herbicides
- F. None of the Above

7. When using \_\_\_\_\_, always avoid prolonged chemical contact with skin. Wash exposed skin areas with generous amounts of soap and water. Launder clothing worn during application in hot water using a phosphate detergent.

- A. Phenoxy herbicide(s)
- B. Pesticides
- C. Herbicide(s)
- D. Lower pressure drift pesticide
- E. Safe insecticide
- F. None of the Above

8. All herbicides can be classified as either selective or nonselective. \_\_\_\_\_ kill certain weeds with little or no injury to the crop. It is the difference in plant response that determines the effectiveness of the herbicide and safety to the crop.

- A. Phenoxy herbicide(s)
- B. Nonselective herbicide(s)
- C. Herbicide (s)
- D. Selective herbicides
- E. Insecticide(s)
- F. None of the Above

9. The risk of drift is great when the application is by foliar spray. When the soil is treated, a hazard may arise from the herbicide persisting in the soil longer than intended and interfering with growing a crop at some later time. The movement of a \_\_\_\_\_ by runoff or by soil erosion to non-target areas is another possibility. Typical 2,4 D injury symptoms on grape leaves.

- A. Phenoxy herbicide(s)
- B. Nonselective herbicide(s)
- C. Herbicide(s)
- D. Selective herbicides
- E. Insecticide(s)
- F. None of the Above

#### **Vapor Drift**

10. Volatility refers to the ability of a \_\_\_\_\_ to vaporize and to mix freely with the air.

- A. Phenoxy herbicide(s)
- B. Nonselective herbicide(s)
- C. Herbicide(s)
- D. Selective herbicides
- E. Insecticide(s)
- F. None of the Above

You are finished with your assignment. Please fax this answer key and your registration page along with the customer survey to TLC.

**If you are a California DPR student, we will require a photocopy of your driver's license.**

Fax Number (928) 272-0747 Always call us after faxing the paperwork to ensure that we've received it. Allow two weeks for processing and for the proper DPR forms to be sent back to you. If you need this course graded and your certificate sooner, add a \$50.00 rush fee. This may not include postage charges.

**Thank you for your business.**

## Invasive Plant Identification CEU Conventional Assignment #3

You will have 90 days from the start of this course to have successfully completed this CEU assignment with a score of 70%. You may e-mail the answers to TLC, info@tlch2o.com, you can also find a copy of this assignment in Word on the Assignment Page on TLC's website or fax the answers to TLC (928) 468-0675. Write your answers on the Answer Key found in the front of first assignment.

**Write your answers on the Answer Key found in the front section of this assignment.**

### Weed Identification Section Topic 1

(s) Means the answer can be plural or singular.

- \_\_\_\_\_ are maintained via controlled pollination or vegetative means, so that cultivar characteristics are passed to ensuing generations.  
A. Cultivars  
B. Ecovar development process(s)  
C. Minimum levels of pesticide(s)  
D. Direct habitat destruction  
E. Negative environmental effect(s)  
F. None of the Above
- To maintain \_\_\_\_\_ in ensuing generations, little to no selection is done during the ecovar development process.  
A. Genetic diversity  
B. Ecovar development process  
C. Minimum levels of pesticide  
D. Direct habitat destruction  
E. Negative environmental effects  
F. None of the Above
- An ecovar is an intermediate step between a wild-growing plant and a \_\_\_\_\_.  
A. Cultivar  
B. Ecovar development process  
C. Minimum levels of pesticide  
D. Direct habitat destruction  
E. Negative environmental effects  
F. None of the Above
- \_\_\_\_\_ may include using row covers or trenches to prevent insects from reaching the crop, baited or pheromone traps to capture insects, or cultivation or mowing for weed control.  
A. Tactics  
B. Ecovar development process(s)  
C. Minimum levels of pesticide(s)  
D. Direct habitat destruction  
E. Negative environmental effect(s)  
F. None of the Above

### Importance of Native Plants

- Invasions of non-native plants are the \_\_\_\_\_ after direct habitat destruction.  
A. Genetic diversity  
B. Ecovar development process  
C. Minimum levels of pesticide  
D. Direct habitat destruction  
E. Negative environmental effects  
F. None of the Above

### Broadleaves (dicots), Grasses (monocots), and Sedges

- Leaf shape can vary dramatically and is a consistent key to plant identification. The leaves may be alternately or oppositely arranged along the \_\_\_\_\_.  
A. Rosettes  
B. Mid-ribs  
C. Flowers  
D. Spikes  
E. Leaves  
F. None of the Above

7. Puncture vine is a prostrate, mat-forming \_\_\_\_\_. It has small leaflets and small yellow flowers with 5 petals. Fruits containing seeds are a sharp, spiny burr that can easily puncture a bicycle inner tube (or gardener's skin!). This weed is found only in thin, less vigorous turf given insufficient water. It will pull easily out of moist soils. Be sure to wear gloves to protect your hands from the burrs. You can discourage the growth of puncture vine by increasing the turf density.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

8. Curly dock is a \_\_\_\_\_ weed in the buckwheat family. Fairly pleasant tasting, the leaves are very rich in vitamins, especially vitamins A and C, and can be eaten raw or cooked.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

9. The roasted seed has been used as a coffee substitute. It is also a very important food plant for the caterpillars of many butterflies. In the spring, basal \_\_\_\_\_ emerge from a stout taproot. These elongated leaves have wavy margins, thus the name "curly" dock. In summer, the plant has reddish, rigid stems, 2-4 feet tall. Flower stems have greenish flowers.

- A. Rosettes
- B. Mid-ribs
- C. Flowers
- D. Spikes
- E. Leaves
- F. None of the Above

10. Milkweed plants, members of the Asclepias family, are the only host plant for the monarch and queen butterflies. The adult females seek out these plants on which they lay their eggs. The caterpillars that hatch will remain on the plants and eat the leaves until they enter the pupal stage, then emerge as adult butterflies. It is a \_\_\_\_\_ herb with long-spreading rhizomes.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

## Invasive Plant Species Introduction Topic 2

### Federally Listed Invasive Plant Species

1. \_\_\_\_\_ has elliptic to lanceolate leaves, its branches are usually thorny, and its fruit is yellow, dry and mealy.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

2. Combining control methods is the best form of \_\_\_\_\_ management. Persistence is imperative so the weed is continually stressed, forcing it to exhaust root nutrient stores and eventually die.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

3. \_\_\_\_\_ was easy to establish and homesteaders liberally landscaped their properties with this drought resistant plant, continually spreading it in their migration to the Western frontier. Also, burial sites were often adorned with toadflax to give everlasting beauty and tranquility. Their legacy has prevailed, proving to be notorious in nature.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

4. The broad and pointed \_\_\_\_\_ leaves can be mistaken for Broadleaf dock (*Rumex obtusifolia*), but docks lack rhizomes and the tall, spreading habit of Japanese knotweed. Other less invasive relatives (such as *P. virginianum*) grow from similar rhizomes and are difficult to eradicate.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

5. \_\_\_\_\_ is difficult to control. Its extensive root system has vast nutrient stores that let it recover from control attempts. Combine control methods into a system to achieve best results.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

6. As an annual, \_\_\_\_\_ reproduces solely by seed. Seeds generally do not remain viable past one year. Repeated hoeing, tilling, or mowing of young plants will prevent seed production. Hand-pulling (with gloves) can also be effective for small infestations.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

7. \_\_\_\_\_ is a branched, robust biennial (or sometimes annual) that often grows 8 feet or more in height and 6 feet in width. Main stems may be up to 4 inches wide at the base. Stems have vertical rows of prominent, spiny, ribbon-like leaf material or "wings" that extend to the base of the flower heads.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

8. \_\_\_\_\_ is an attractive ornamental plant known for its spiraling evergreen leaves and greenish-yellow, bitter-fragrant flowers. Larger patches of this species emit a strong unpleasant odor. Flowering occurs in late winter-early spring, producing clusters of blue berries during the spring.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

9. \_\_\_\_\_ is a perennial with erect, smooth, herbaceous stems that are less than 2 feet tall and emerge in clumps from a spreading root system. Soft, gray-green leaves, which are 1 to 1 1/2 inches long and narrow, are crowded onto each stem.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

10. This plant has stems that terminate with clusters of 15 to 20 snapdragon-like flowers that are about 1 inch long and yellow. Gently pinching the sides of a flower opens its 2 lips revealing an orange throat that acts as a guide for insects to nectar produced in the spur. The plant reproduces by seeds and creeping roots.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

## Commonly Found Invasive and/or Noxious Weeds - Topic 3

1. Musk thistle rosettes are usually large and compact with a large, corky taproot that is hollow near the \_\_\_\_\_. Leaves have consistent shape, sometimes expressing a frosted appearance around the leaf margins, and often have a cream-colored midrib.
- A. Rosettes
  - B. Mid-rib
  - C. Flowers
  - D. Crown
  - E. Leaves
  - F. None of the Above
2. Musk thistle flowers and starts to produce seed 45 to 55 days after it bolts. Musk thistle has very large bracts beneath flowers that are armed with sharp spines and shoots beneath flowers are almost devoid of \_\_\_\_\_.
- A. Rosettes
  - B. Mid-ribs
  - C. Flowers
  - D. Spikes
  - E. Leaves
  - F. None of the Above
3. \_\_\_\_\_ will not tolerate tillage and can be removed easily by severing its root below ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed.
- A. Mullein
  - B. Fountain grass
  - C. Loosestrife
  - D. Chinese lespedeza
  - E. Canada thistle
  - F. None of the Above
4. In natural areas where Canada thistle is interspersed with desirable native plants, targeted application of a systemic herbicide such as \_\_\_\_\_, which carries plant toxins to the roots, may be effective.
- A. Triclopyr (e.g., Garlon)
  - B. Glyphosate (e.g., Roundup or Rodeo)
  - C. Chlorpyralid (e.g. Transline)
  - D. Herbicide applications
  - E. Systemic herbicide(s)
  - F. None of the Above
5. Multiple treatments are necessary every year for several years, making leafy spurge control an extremely expensive undertaking. If left uncontrolled for a single year, \_\_\_\_\_ can re-infest rapidly. Prescribed burning, in conjunction with herbicides, may also be effective.
- A. Mullein
  - B. Fountain grass
  - C. Loosestrife
  - D. Leafy spurge
  - E. Canada thistle
  - F. None of the Above
6. The addition of a non-ionic surfactant at a concentration of 0.5% improves the effectiveness of foliar treatments. \_\_\_\_\_ have been shown to be effective in controlling Chinese lespedeza.
- A. Triclopyr (e.g., Garlon)
  - B. Triclopyr and clopyralid
  - C. Chlorpyralid (e.g. Transline)
  - D. Herbicide applications
  - E. Systemic herbicide(s)
  - F. None of the Above
7. \_\_\_\_\_ plants grow from four to ten feet high, depending upon conditions, and produce a showy display of magenta-colored flower spikes throughout much of the summer. Flowers have five to seven petals. Mature plants can have from 30 to 50 stems arising from a single rootstock.
- A. Mullein
  - B. Fountain grass
  - C. Loosestrife
  - D. Chinese lespedeza
  - E. Canada thistle
  - F. None of the Above

8. \_\_\_\_\_ raises fuel loads, which increases the intensity and spread of a fire, and results in severe damage to native, dry forest species adapted to less extreme fire regimes.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

9. First year \_\_\_\_\_ plants are low-growing rosettes of bluish gray-green, felt-like leaves that range from 4-12 inches in length and 1-5 inches in width.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

## Introduction to Grasses

### Exotic Grass Control

10. Exotic grasses have become one of the most insidious problems in the field of wildlife management, because they can totally dominate pasture and prairie lands once established, having little wildlife value and leaving no room for native plants. Repeated applications of \_\_\_\_\_ are required for control.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Chemical applications
- E. Herbicide(s)
- F. None of the Above

## Herbs and Related Invasive Species Topic 4

1. When glyphosate is applied to susceptible plants, glyphosate blocks EPSP synthase preventing the production of essential amino acids and the plant dies. However, in plants that are Roundup Ready, a modified EPSP synthase is unaffected by glyphosate and allows the plant to continue growing. There is little or no crop injury associated with \_\_\_\_\_ application and Roundup Ready alfalfa.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

2. If the glyphosate application is made after the \_\_\_\_\_, some yield loss may occur due to the competitive effects of the weed on the crop; in other words, the damage has already been done.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

### Glyphosate Stewardship

3. Rotation to non-Roundup Ready crops using \_\_\_\_\_ after Roundup Ready crops is also effective in reducing the potential for glyphosate-resistant weeds.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

4. \_\_\_\_\_ is most commonly used. However, herb Robert often occurs initially as part of a mosaic alongside desirable native species. In these situations, alternative control methods that have the ability to target individual plants can more successfully meet all goals of a project.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

5. Grass Family (Poaceae). Toothache grass is a\_\_\_\_\_.
- A. Winter annual            D. Warm-season, perennial bunch grass  
 B. Summer annual        E. Cold season perennial bunch grass  
 C. Biennial grass        F. None of the Above
6. \_\_\_\_\_ is a postemergence herbicide that is slowly translocated within the plant. It can effectively control tillered crabgrass with a single application.
- A. Quinclorac                D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl      F. None of the Above
7. \_\_\_\_\_ acts as a preemergence and postemergence herbicide. It provides postemergence control of crabgrass only up to the one-tiller stage of development, but it can be combined with fenoxaprop-p-ethyl when two or more tillers are present.
- A. Quinclorac                D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl      F. None of the Above
8. \_\_\_\_\_ is a postemergence herbicide effective in controlling crabgrass and some broadleaf weeds.
- A. Quinclorac                D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl      F. None of the Above
9. Quinclorac can be mixed with other herbicides, including\_\_\_\_\_, to improve weed control. For best results, apply quinclorac in combination with a methylated seed oil according to directions on the label.
- A. Quinclorac                D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl      F. None of the Above
10. \_\_\_\_\_ leaves, in comparison, are smooth or only sparsely hairy; and the leaf segment is longer, more rounded, and lance-shaped. The somewhat rounded terminal clusters of flower heads of western yarrow are normally white to cream-colored and have an extended bloom period from May to September.
- A. Autumn olive              D. Eurasian watermilfoil  
 B. Canada thistle            E. Common yarrow  
 C. Dalmatian toadflax      F. None of the Above

## Vine Section Alien Plant Invaders Topic 5

1. Akebia vines may also be dug up, removing as much of the roots as possible. To ensure its complete removal, regular monitoring and repeated cutting, digging or pulling is necessary. For large infestations, use of a labeled systemic herbicide, such as glyphosate (e.g., Roundup) or triclopyr (e.g., Garlon), is probably the most effective method to control akebia. An herbicidal soap, such as\_\_\_\_\_, which provides a burndown of plant tissues, may also provide some control.
- A. Triclopyr (e.g., Garlon)            D. Herbicide applications  
 B. Dithiopyr                            E. Pelargonic acid (e.g., Scythe)  
 C. Chlorpyralid (e.g. Transline)      F. None of the Above



2. Once established, the vine quickly overwhelms and destroys native vegetation by shading out smaller plants and outcompeting native vegetation for water and nutrients. Urban parks, with extensive wooded borders neighboring landscaped residential and private property, are especially vulnerable to invasion by \_\_\_\_\_.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

3. Clusters of small greenish flowers emerge from leaf axils, allowing each plant to produce large numbers of seeds. At maturity, globular, green to yellow fruits split open to reveal three red-orange, fleshy arils that contain the seeds. These showy fruits have made \_\_\_\_\_ very popular for use in floral arrangements.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet
- E. Fountain grass
- F. None of the Above

4. A variety of \_\_\_\_\_ are available for management of climbing euonymus. Grubbing, a rather labor intensive method, is effective for small populations or environmentally sensitive areas where herbicides cannot be used.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Mechanical and chemical methods
- F. None of the Above

5. Because English ivy is an evergreen vine, and remains active during the winter, \_\_\_\_\_ can be made to it any time of year as long as temperatures are above 55 or 60°Fahrenheit for a few days.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

6. Fall and winter applications will avoid or minimize impacts to many native plant species. Repeat \_\_\_\_\_ are likely to be needed and follow-up monitoring should be conducted to evaluate the success of treatments.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

7. Several \_\_\_\_\_ (e.g., glyphosate and triclopyr) move through the plant to the roots when applied to the leaves or stems and have been used effectively on Japanese honeysuckle.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

8. Local bird populations are important for dispersal under utility lines, bird feeders, fence lines and other perching locations. Other animals observed eating \_\_\_\_\_ fruits are chipmunks, squirrel and deer.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

9. Cut \_\_\_\_\_ can be fed to livestock, burned or enclosed in plastic bags and sent to a landfill. If conducted in the spring, cutting must be repeated as regrowth appears to exhaust the plant's stored carbohydrate reserves.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

10. \_\_\_\_\_ is effective at a concentration of 0.5% and is selective to plants in the aster, buckwheat, and pea families. Caution should be taken with chlorpyralid as groundwater pollution through leaching can be a problem with certain soil types. Do not apply spray so heavily that herbicide drips off the leaves.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

## Trees- Alien Plant Invaders Topic 6

1. Targeting large female trees for control will help reduce spread of \_\_\_\_\_ by seed.

- A. Silk tree(s)
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

2. \_\_\_\_\_ can be controlled using a variety of mechanical and chemical controls. Hand pulling may be effective for young seedlings. Plants should be pulled as soon as they are large enough to grasp.

- A. Silk tree(s)
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

3. Princess tree seedlings and small trees can be controlled by applying a 2% solution of \_\_\_\_\_ or triclopyr (e.g., Garlon) and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

4. Because \_\_\_\_\_ spreads by suckering, resprouts are common after treatment. Cutting is an initial control measure and will require either an herbicidal control or repeated cutting for resprouts.

- A. Mimosa
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

5. Whenever possible, efforts should be taken to prevent the introduction or encroachment of \_\_\_\_\_. For example, recently disturbed beach habitat may be planted with native vegetation to prevent Australian pine from invading.

- A. Silk tree(s)
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

6. Clumps of seedlings suggest dispersal by small mammals. In its native range, \_\_\_\_\_ is pollinated by bees, which are the likely pollinators in Florida.

- A. Silk tree(s)
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

7. \_\_\_\_\_ kills broadleaf (dicotyledonous) plants but causes little or no damage to grasses and is useful for areas where desirable grasses are to be maintained.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

8. Unfortunately, \_\_\_\_\_ seedlings often grow in low litter areas, unsuitable for frequent prescribed fire. In dense stands, seedlings and saplings may be cut and dropped on site, creating fuel for future fires.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

9. \_\_\_\_\_ seedlings appear vulnerable to fire, perhaps due to their poorly established root structure. Fire will top kill a mature plant, but resprouting does occur.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

10. Uprooting of 1/2 inch diameter seedlings by hand or up to 1 1/2 inch diameter using a weed wrench is effective, but care should be taken to avoid excessive disturbance to the soil, which can release \_\_\_\_\_ seeds stored in the soil.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

## Weed Management and Control Section Topic 7

1. \_\_\_\_\_ is necessary following mechanical or chemical control. Digging and chopping cause soil disturbance and desired plants need to be reestablished before the invader can get a foothold. The same is true of chemical control, the desired vegetation must be reestablished. Moreover, you must remember that the invader was able to gain a toehold under the management regime that had been in place on that land.

- A. Chemical control
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

### Cultural Control

2. Controlling weeds on such sites can be futile without \_\_\_\_\_, as weeds will readily re-invade the disturbed area.

- A. Chemical control
- B. Vegetative restoration
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

3. \_\_\_\_\_ are available as concentrated liquids, (2 to 8 lb/gal) which need to be mixed with water before applying; as wettable powders which are from 50 to 100% active ingredient and need to be dispersed in water for uniform application, or as granules which are from 1 to 10% active ingredient and which are applied dry with granular applicators. See the label for all instructions on labeled crops and timings.

- A. Weed control chemicals
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

4. Most effective control of \_\_\_\_\_ broadleaf weeds is obtained when applied in early fall (August 15–October 15) or in spring (May 1–June 1). For some weeds, repeated application at 20–30 day intervals may be required for control.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Summer annuals (AKA warm season annuals)
- F. None of the Above

5. \_\_\_\_\_ kill all plants, both desirable and undesirable. These herbicides can be used to spot treat perennial grassy weeds that are not affected by selective herbicides. To spot treat an area, thoroughly wet the weed foliage with herbicide solution.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Nonselective postemergence herbicides
- E. Systemic herbicides
- F. None of the Above

6. \_\_\_\_\_ is referred to as a desiccant because it causes a leaf or an entire plant to dry out quickly. It is used to desiccate potato vines and seed crops, to control flowering of sugarcane, and for industrial and aquatic weed control. It is not residual; that is, it does not leave any trace of herbicide on or in plants, soil, or water.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Diquat dibromide
- F. None of the Above

7. The product Agent Orange, used extensively throughout Vietnam, was about 50% 2,4-D. However, the controversies associated with the use of Agent Orange were associated with a contaminant (\_\_\_\_\_ ) in the 2,4,5-T component of the defoliant.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Dioxin
- F. None of the Above

**Imazapyr** (Trade name Habitat®).

8. Although imazapyr is a \_\_\_\_\_, a good applicator can somewhat selectively remove targeted plants by focusing the spray only on the plants to be removed.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

### **Persistence of Pesticides**

9. Persistence refers to the length of time a pesticide remains in the environment. This depends on how quickly it breaks down (degrades), which is largely a function of its \_\_\_\_\_. Persistence is usually expressed as the "half-life" (T<sub>1/2</sub>) of a pesticide.

- A. Chemical control
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

10. Pesticides can be degraded by sunlight (photodecomposition), high air or water temperatures (thermal degradation), moisture conditions, biological action (microbial decay), and soil conditions (pH). \_\_\_\_\_ break down slowly and may be more available to aquatic animals.

- A. Persistent (long-lasting) pesticides
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (short-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

## **Introduction to Wetlands Section Topic 8**

### **Filamentous Algae**

1. Unlike microscopic algae, \_\_\_\_\_ are frequently a problem in pond management and are usually visible to the naked eye as a floating mat of thread-like filaments often called "pond moss". They usually begin growth on the pond bottom in shallow water, later float to the surface and may completely cover the pond surface.

- A. Filamentous algae
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

### Biological Control

2. Grass carp are not very effective at controlling \_\_\_\_\_, except at very high densities. Grass carp do not control planktonic algae.
- A. Water lettuce
  - B. Hydrilla
  - C. Water hyacinths
  - D. Parrotfeather
  - E. Eurasian watermilfoil
  - F. None of the Above

### Economic Importance

3. \_\_\_\_\_ are a severe environmental and economic problem in all of the gulf coast states and in many other areas of the world with a sub-tropical or tropical climate. This species has rapidly spread throughout inland and coastal freshwater bays, lakes, and marshes in the United States and in other countries.
- A. Water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Alders
  - E. Eurasian watermilfoil
  - F. None of the Above
4. When big floating bladderwort is flowering it is easily distinguished from its native cousins by large spoke-like floats that radiate out from the base of the flower stalk. During the rest of the year, however, it can be confused with \_\_\_\_\_, both of which are rather robust and can appear almost bushy underwater.
- A. Water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Common bladderwort
  - E. Eurasian watermilfoil
  - F. None of the Above

### Control

5. Years of research to find insect biocontrols has resulted in the successful introduction of two insects which are believed to be helpful in keeping water lettuce under maintenance control in many places; however, biocontrol fish which are able to control submersed plants are ineffective against the \_\_\_\_\_.
- A. Floating water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Algae
  - E. Eurasian watermilfoil
  - F. None of the Above
6. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.
- A. Glyphosate herbicides
  - B. Dithiopyr
  - C. Nonglyphosate herbicides
  - D. Broad spectrum, non-selective herbicides
  - E. Systemic herbicides
  - F. None of the Above
7. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. \_\_\_\_\_ (see the label) will have to be added to the glyphosate solution for good results.
- A. Glyphosate herbicide
  - B. Dithiopyr
  - C. Nonglyphosate herbicide
  - D. Broad spectrum, non-selective herbicide
  - E. Systemic herbicide
  - F. None of the Above
8. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of \_\_\_\_\_.
- A. Glyphosate herbicide
  - B. Dithiopyr
  - C. Triclopyr
  - D. Broad spectrum, non-selective herbicide
  - E. Systemic herbicide
  - F. None of the Above

9. \_\_\_\_\_ benefit other plants growing near them by taking nitrogen out of the air and depositing it in the soil in usable form; fallen alder leaves make very rich compost.

- A. Water lettuce
- B. Big floating bladderwort
- C. Water hyacinths
- D. Alders
- E. Eurasian watermilfoil
- F. None of the Above

10. One danger with any chemical control method is the chance of oxygen depletion after the treatment caused by the decomposition of the dead plant material. \_\_\_\_\_ depletions can kill fish in the pond. If the pond is heavily infested with weeds it may be possible (depending on the herbicide chosen) to treat the pond in sections and let each section decompose for about two weeks before treating another section. Aeration, particularly at night, for several days after treatment may help control the oxygen depletion.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

## Submersed (underwater) Aquatic Weed Section Topic 9

1. Renovate is a liquid triclopyr formulation that is effective on \_\_\_\_\_. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

2. A variety of physical, chemical, and biological control methods have been used in attempts to manage infestations of \_\_\_\_\_. Unfortunately, complete eradication is rare.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

3. Navigate and Aqua-Kleen is a granular butoxyethyl ester of 2,4-D and has been effective on Eurasian watermilfoil. \_\_\_\_\_ are systemic herbicides. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. 2,4-D compounds
- F. None of the Above

4. Reward is a liquid diquat formulation that has been effective on Eurasian watermilfoil and is very effective if mixed with a copper compound. It is a contact herbicide. \_\_\_\_\_ act quickly and kill all plants cells that they contact.

- A. Systemic herbicide(s)
- B. Liquid formulation
- C. Liquid diquat formulation
- D. Contact herbicides
- E. Copper
- F. None of the Above

5. Renovate is a \_\_\_\_\_ that is effective on Eurasian watermilfoil. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Lliquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

6. Aquathol, Aquathol K, and Aquathol Super K are \_\_\_\_\_ and comes in both liquid and granular formulations. These endothall products have been effective on Eurasian watermilfoil and can be mixed with copper compounds for additional effectiveness. Contact herbicides act quickly and kill all plant cells that they contact.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid diquat formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Dipotassium salts of endothall
- F. None of the Above

7. Sonar and Avast are fluridone compounds, come in both liquid and granular formulations, and have been effective on Eurasian watermilfoil. These are broad spectrum, systemic herbicides. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid diquat formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. Copper
- F. None of the Above

8. Any aquatic plant identified as \_\_\_\_\_ should be sent to a specialist for positive identification since hydrilla is such a serious threat to fresh water habitats. It is only through early identification and concentrated control methods that there is any hope of eliminating hydrilla. Fishermen or boaters in waters known to have hydrilla should make every effort not to accidentally transport hydrilla from one lake or pond to another.

- A. Water lettuce
- B. Hydrilla
- C. Egeria, elodea, or hydrilla
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

### **Pond Water Chemistry**

9. The water hardness also should be considered when using herbicides containing copper. Water hardness--Generally, water hardness is a measure of the \_\_\_\_\_ in the water. In hard waters (above 50 parts per million hardness) it may be necessary to apply greater amounts of herbicide in order to achieve control. In soft waters (below 50 parts per million hardness) some herbicides are more toxic to fish and plants.

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

10. Copper--In soft water some heavy metals, especially \_\_\_\_\_, can be toxic to fish. Some herbicides contain copper and should be used with caution in soft water ponds (less than 50 parts per million water hardness).

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

## **Aquatic Herbicides and Controls Section Topic 10**

1. \_\_\_\_\_ is used as a defoliant for a wide range of crops and as a herbicide for both terrestrial and aquatic weeds.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Endothall
- E. Systemic herbicide
- F. None of the Above

2. Field and laboratory tests show that \_\_\_\_\_ usually remains in the top inch of soil for long periods of time after it is applied.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

3. Glyphosate itself is an acid, but it is commonly used in salt form, most commonly the isopropylamine salt. It may also be available in \_\_\_\_\_. It is generally distributed as water-soluble concentrates and powders.

- A. Glyphosate herbicides
- B. Acidic or trimethylsulfonium salt forms
- C. Nonglyphosate herbicides
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicides
- F. None of the Above

4. Some formulations of \_\_\_\_\_ are highly toxic to fish while others are less so. For example, the LC50 ranges between 1.0 and 100 mg/L in cutthroat trout, depending on the formulation used. Channel catfish had less than 10% mortality when exposed to 10 mg/L for 48 hours.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

5. \_\_\_\_\_ can be effective for spot treatment of Eurasian watermilfoil and is relatively selective to Eurasian watermilfoil when used at the labeled rate.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Triclopyr
- E. Systemic herbicide
- F. None of the Above

6. \_\_\_\_\_ can show good control of submersed plants where there is little water movement and an extended time for the treatment. Its use is most applicable to whole-lake or isolated bay treatments where dilution can be minimized. It is not effective for spot treatments of areas less than five acres.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

7. Most species of algae can be controlled with very low concentrations of \_\_\_\_\_. It is available in crystalline nuggets the size of rock salt or as a finely ground "snow" grade.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Copper sulfate
- E. Cutrine Plus
- F. None of the Above

8. \_\_\_\_\_, under field conditions, is effective in controlling a broad range of algae including Chara, Spirogyra, Cladophora, Vaucheria, Ulothrix, Microcystis, and Oscillatoria. Effective in hard water.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Cutrine Plus
- E. Copper sulfate
- F. None of the Above

9. \_\_\_\_\_ is a concentrated liquid aquatic herbicide effective against a wide variety of submersed, emergent, and floating aquatic plants including duckweed, naiads, and cattails.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

10. \_\_\_\_\_ poses virtually no environmental risk in aquatic applications because the herbicide concentration rapidly decreases as it is absorbed onto soil, vegetation, and organic matter.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Reward
- E. Systemic herbicide
- F. None of the Above



## Invasive Plant Rule Section Topic 11

1. \_\_\_\_\_ in general are formulated in two ways, as esters or amines.  
A. Triclopyr  
B. Dithiopyr  
C. Nonglyphosate herbicide(s)  
D. Phenoxy herbicides  
E. Dioxin(s)  
F. None of the Above
2. \_\_\_\_\_ are more effective in controlling hard-to-kill weeds but are the most hazardous in terms of volatility and consequent drift to sensitive crops.  
A. Triclopyr  
B. Dithiopyr  
C. Nonglyphosate herbicide(s)  
D. Glyphosate (Roundup™)  
E. Dioxin(s)  
F. None of the Above
3. There are two categories of esters: the regular form and the low-volatile form. The latter form is less likely to cause problems. The \_\_\_\_\_ formulations are safer to use than are the esters, but they are less effective in their performance.  
A. Ester(s)  
B. 2,4 D  
C. Amine  
D. 2,4-D, 2,4,5-T, 2,4-DB, 2,4,5-TP (Silvex) and MCPA  
E. Non-selective herbicides  
F. None of the Above

### Symptoms of Injury

4. Mere traces of a \_\_\_\_\_ may cause sensitive plants to produce abnormally large leaves, exaggerated distances between leaves and multiplied or enlarged flowering or fruiting parts.  
A. Phenoxy herbicide  
B. Hazardous pesticides  
C. Non-selective herbicides  
D. Greater concentrations of the herbicide  
E. Registration and labeling of a particular pesticide  
F. None of the Above
5. Greater concentrations of the \_\_\_\_\_ can cause stunting and cupping of leaves, spiraling growth of soft shoots, clearing and enlargement of major leaf veins and severe distortion of flowering or fruiting parts. After severe exposure, leaves may be fan-shaped or severely stunted and curled, with extensive development of small teeth along leaf margins.  
A. Phenoxy herbicide(s)  
B. Nonselective herbicide(s)  
C. Herbicide(s)  
D. Selective herbicides  
E. Insecticide(s)  
F. None of the Above

### Long-term Effects

6. Severe cases of \_\_\_\_\_ injury may result in stunted growth and poor ripening for two to four years after exposure. Growers seeking monetary compensation should be aware of these long-term effects and not be too quick to settle damage claims.  
A. Phenoxy herbicide  
B. Hazardous pesticides  
C. Non-selective herbicides  
D. Greater concentrations of the herbicide  
E. Registration and labeling of a particular pesticide  
F. None of the Above

### Resolving Problems

7. User responsibility. Registration and labeling of a \_\_\_\_\_ clearly give individuals the right to apply the pesticide as long as they follow the directions for use and the precautions stated on the label.  
A. Herbicide use(s)  
B. Particular pesticide(s)  
C. Greater concentrations of the herbicide(s)  
D. Herbicide volatility  
E. Phenoxy herbicide(s)  
F. None of the Above

8. The use of a pesticide in any way contrary to the label is a violation of federal law. Misuse of a \_\_\_\_\_ may make the user liable to either criminal prosecution or to civil proceedings or both.

- A. Phenoxy herbicide
- B. Pesticide
- C. Non-selective herbicide
- D. Greater concentrations of the herbicide
- E. Registration and labeling of a particular pesticide
- F. None of the Above

9. Although there is no legal obligation for herbicide applicators to take stock of sensitive crops in the area of application and to consult and cooperate with neighbors in matters of \_\_\_\_\_, it is advisable to do so.

- A. Herbicide use(s)
- B. Particular pesticide(s)
- C. Greater concentrations of the herbicide(s)
- D. Herbicide volatility
- E. Phenoxy herbicide(s)
- F. None of the Above

10. Growers of sensitive crops are not obligated to inform operators of surrounding farms and local industries of the presence and sensitivity of their crops, but it is advisable to seek the cooperation of neighbors in the use of \_\_\_\_\_. Reporting incidents of pesticide damage. Two governmental agencies may exercise regulatory powers in situations of herbicide misuse.

- A. Phenoxy herbicide(s)
- B. Hazardous pesticides
- C. Non-selective herbicides
- D. Greater concentrations of the herbicide(s)
- E. Registration and labeling of a particular pesticide(s)
- F. None of the Above

You are finished with your assignment. Please fax this answer key and your registration page along with the customer survey to TLC.

**If you are a California DPR student, we will require a photocopy of your driver's license.**

Fax Number (928) 272-0747 Always call us after faxing the paperwork to ensure that we've received it. Allow two weeks for processing and for the proper DPR forms to be sent back to you. If you need this course graded and your certificate sooner, add a \$50.00 rush fee. This may not include postage charges.

**Thank you for your business.**

## Invasive Plant Identification CEU Conventional Assignment #4

You will have 90 days from the start of this course to have successfully completed this CEU assignment with a score of 70%. You may e-mail the answers to TLC, info@tlch2o.com, you can also find a copy of this assignment in Word on the Assignment Page on TLC's website or fax the answers to TLC (928) 468-0675. Course assistance is available on the Assignment Page under Course Assistance at www.abctlc.com. Write your answers on the Answer Key found in the front of first assignment.

**Write your answers on the Answer Key found in the front section of this assignment.**

### Weed Identification Section Topic 1

(s) Means the answer can be plural or singular.

#### Understanding Weed Terms

- The key is to use pesticides in a way that complements rather than hinders \_\_\_\_\_ in the strategy and which also limits negative environmental effects.  
A. Other elements  
B. Ecovar development process  
C. Minimum levels of pesticide  
D. Direct habitat destruction  
E. Negative environmental effects  
F. None of the Above
- It is important to understand the life cycle of a pest so that the pesticide can be applied when the pest is \_\_\_\_\_ – the aim is to achieve maximum effect at minimum levels of pesticide.  
A. At its most vulnerable  
B. Ecovar development process  
C. Minimum levels of pesticide  
D. Direct habitat destruction  
E. Negative environmental effects  
F. None of the Above
- \_\_\_\_\_ are maintained via controlled pollination or vegetative means, so that cultivar characteristics are passed to ensuing generations.  
A. Cultivars  
B. Ecovar development process(s)  
C. Minimum levels of pesticide(s)  
D. Direct habitat destruction  
E. Negative environmental effect(s)  
F. None of the Above
- To maintain \_\_\_\_\_ in ensuing generations, little to no selection is done during the ecovar development process.  
A. Genetic diversity  
B. Ecovar development process  
C. Minimum levels of pesticide  
D. Direct habitat destruction  
E. Negative environmental effects  
F. None of the Above
- An ecovar is an intermediate step between a wild-growing plant and a \_\_\_\_\_.  
A. Cultivar  
B. Ecovar development process  
C. Minimum levels of pesticide  
D. Direct habitat destruction  
E. Negative environmental effects  
F. None of the Above
- \_\_\_\_\_ may include using row covers or trenches to prevent insects from reaching the crop, baited or pheromone traps to capture insects, or cultivation or mowing for weed control.  
A. Tactics  
B. Ecovar development process(s)  
C. Minimum levels of pesticide(s)  
D. Direct habitat destruction  
E. Negative environmental effect(s)  
F. None of the Above

### Importance of Native Plants

7. Invasions of non-native plants are the \_\_\_\_\_ after direct habitat destruction.
- A. Genetic diversity
  - B. Ecovar development process
  - C. Minimum levels of pesticide
  - D. Direct habitat destruction
  - E. Negative environmental effects
  - F. None of the Above

### Broadleaves (dicots), Grasses (monocots), and Sedges

8. Leaf shape can vary dramatically and is a consistent key to plant identification. The leaves may be alternately or oppositely arranged along the \_\_\_\_\_.

- A. Rosettes
- B. Mid-ribs
- C. Flowers
- D. Spikes
- E. Leaves
- F. None of the Above

9. Puncture vine is a prostrate, mat-forming \_\_\_\_\_. It has small leaflets and small yellow flowers with 5 petals. Fruits containing seeds are a sharp, spiny burr that can easily puncture a bicycle inner tube (or gardener's skin!). This weed is found only in thin, less vigorous turf given insufficient water. It will pull easily out of moist soils. Be sure to wear gloves to protect your hands from the burrs. You can discourage the growth of puncture vine by increasing the turf density.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

10. Milkweed plants, members of the Asclepias family, are the only host plant for the monarch and queen butterflies. The adult females seek out these plants on which they lay their eggs. The caterpillars that hatch will remain on the plants and eat the leaves until they enter the pupal stage, then emerge as adult butterflies. It is a \_\_\_\_\_ herb with long-spreading rhizomes.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

## Invasive Plant Species Introduction Topic 2

### Federally Listed Invasive Plant Species

1. \_\_\_\_\_ has elliptic to lanceolate leaves, its branches are usually thorny, and its fruit is yellow, dry and mealy.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

2. Combining control methods is the best form of \_\_\_\_\_ management. Persistence is imperative so the weed is continually stressed, forcing it to exhaust root nutrient stores and eventually die.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

3. \_\_\_\_\_ was easy to establish and homesteaders liberally landscaped their properties with this drought resistant plant, continually spreading it in their migration to the Western frontier. Also, burial sites were often adorned with toadflax to give everlasting beauty and tranquility. Their legacy has prevailed, proving to be notorious in nature.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

4. The broad and pointed \_\_\_\_\_ leaves can be mistaken for Broadleaf dock (*Rumex obtusifolia*), but docks lack rhizomes and the tall, spreading habit of Japanese knotweed. Other less invasive relatives (such as *P. virginianum*) grow from similar rhizomes and are difficult to eradicate.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

5. \_\_\_\_\_ is difficult to control. Its extensive root system has vast nutrient stores that let it recover from control attempts. Combine control methods into a system to achieve best results.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

6. As an annual, \_\_\_\_\_ reproduces solely by seed. Seeds generally do not remain viable past one year. Repeated hoeing, tilling, or mowing of young plants will prevent seed production. Hand-pulling (with gloves) can also be effective for small infestations.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

7. \_\_\_\_\_ is a branched, robust biennial (or sometimes annual) that often grows 8 feet or more in height and 6 feet in width. Main stems may be up to 4 inches wide at the base. Stems have vertical rows of prominent, spiny, ribbon-like leaf material or "wings" that extend to the base of the flower heads.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

8. \_\_\_\_\_ is an attractive ornamental plant known for its spiraling evergreen leaves and greenish-yellow, bitter-fragrant flowers. Larger patches of this species emit a strong unpleasant odor. Flowering occurs in late winter-early spring, producing clusters of blue berries during the spring.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

9. \_\_\_\_\_ is a perennial with erect, smooth, herbaceous stems that are less than 2 feet tall and emerge in clumps from a spreading root system. Soft, gray-green leaves, which are 1 to 1 1/2 inches long and narrow, are crowded onto each stem.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

10. This plant has stems that terminate with clusters of 15 to 20 snapdragon-like flowers that are about 1 inch long and yellow. Gently pinching the sides of a flower opens its 2 lips revealing an orange throat that acts as a guide for insects to nectar produced in the spur. The plant reproduces by seeds and creeping roots.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

## Commonly Found Invasive and/or Noxious Weeds - Topic 3

1. Musk thistle rosettes are usually large and compact with a large, corky taproot that is hollow near the \_\_\_\_\_. Leaves have consistent shape, sometimes expressing a frosted appearance around the leaf margins, and often have a cream-colored midrib.  
A. Rosettes                      D. Crown  
B. Mid-rib                        E. Leaves  
C. Flowers                        F. None of the Above
2. Musk thistle flowers and starts to produce seed 45 to 55 days after it bolts. Musk thistle has very large bracts beneath flowers that are armed with sharp spines and shoots beneath flowers are almost devoid of \_\_\_\_\_.  
A. Rosettes                      D. Spikes  
B. Mid-ribs                       E. Leaves  
C. Flowers                        F. None of the Above
3. \_\_\_\_\_ will not tolerate tillage and can be removed easily by severing its root below ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed.  
A. Mullein                        D. Chinese lespedeza  
B. Fountain grass               E. Canada thistle  
C. Loosestrife                  F. None of the Above
4. In natural areas where Canada thistle is interspersed with desirable native plants, targeted application of a systemic herbicide such as \_\_\_\_\_, which carries plant toxins to the roots, may be effective.  
A. Triclopyr (e.g., Garlon)                      D. Herbicide applications  
B. Glyphosate (e.g., Roundup or Rodeo) E. Systemic herbicide(s)  
C. Chlorpyralid (e.g. Transline)                F. None of the Above
5. Multiple treatments are necessary every year for several years, making leafy spurge control an extremely expensive undertaking. If left uncontrolled for a single year, \_\_\_\_\_ can re-infest rapidly. Prescribed burning, in conjunction with herbicides, may also be effective.  
A. Mullein                        D. Leafy spurge  
B. Fountain grass               E. Canada thistle  
C. Loosestrife                  F. None of the Above
6. The addition of a non-ionic surfactant at a concentration of 0.5% improves the effectiveness of foliar treatments. \_\_\_\_\_ have been shown to be effective in controlling Chinese lespedeza.  
A. Triclopyr (e.g., Garlon)                      D. Herbicide applications  
B. Triclopyr and clopyralid                    E. Systemic herbicide(s)  
C. Chlorpyralid (e.g. Transline)                F. None of the Above
7. \_\_\_\_\_ plants grow from four to ten feet high, depending upon conditions, and produce a showy display of magenta-colored flower spikes throughout much of the summer. Flowers have five to seven petals. Mature plants can have from 30 to 50 stems arising from a single rootstock.  
A. Mullein                        D. Chinese lespedeza  
B. Fountain grass               E. Canada thistle  
C. Loosestrife                  F. None of the Above

8. \_\_\_\_\_ raises fuel loads, which increases the intensity and spread of a fire, and results in severe damage to native, dry forest species adapted to less extreme fire regimes.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

9. First year \_\_\_\_\_ plants are low-growing rosettes of bluish gray-green, felt-like leaves that range from 4-12 inches in length and 1-5 inches in width.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

## Introduction to Grasses

### Exotic Grass Control

10. Exotic grasses have become one of the most insidious problems in the field of wildlife management, because they can totally dominate pasture and prairie lands once established, having little wildlife value and leaving no room for native plants. Repeated applications of \_\_\_\_\_ are required for control.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Chemical applications
- E. Herbicide(s)
- F. None of the Above

## Herbs and Related Invasive Species Topic 4

1. When glyphosate is applied to susceptible plants, glyphosate blocks EPSP synthase preventing the production of essential amino acids and the plant dies. However, in plants that are Roundup Ready, a modified EPSP synthase is unaffected by glyphosate and allows the plant to continue growing. There is little or no crop injury associated with \_\_\_\_\_ application and Roundup Ready alfalfa.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

2. If the glyphosate application is made after the \_\_\_\_\_, some yield loss may occur due to the competitive effects of the weed on the crop; in other words, the damage has already been done.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

### Glyphosate Stewardship

3. Rotation to non-Roundup Ready crops using \_\_\_\_\_ after Roundup Ready crops is also effective in reducing the potential for glyphosate-resistant weeds.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

4. \_\_\_\_\_ is most commonly used. However, herb Robert often occurs initially as part of a mosaic alongside desirable native species. In these situations, alternative control methods that have the ability to target individual plants can more successfully meet all goals of a project.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

5. Grass Family (Poaceae). Toothache grass is a\_\_\_\_\_.
- A. Winter annual            D. Warm-season, perennial bunch grass  
 B. Summer annual        E. Cold season perennial bunch grass  
 C. Biennial grass         F. None of the Above
6. \_\_\_\_\_ is a postemergence herbicide that is slowly translocated within the plant. It can effectively control tillered crabgrass with a single application.
- A. Quinclorac                D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl     F. None of the Above
7. \_\_\_\_\_ acts as a preemergence and postemergence herbicide. It provides postemergence control of crabgrass only up to the one-tiller stage of development, but it can be combined with fenoxaprop-p-ethyl when two or more tillers are present.
- A. Quinclorac                D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl     F. None of the Above
8. \_\_\_\_\_ is a postemergence herbicide effective in controlling crabgrass and some broadleaf weeds.
- A. Quinclorac                D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl     F. None of the Above
9. Quinclorac can be mixed with other herbicides, including\_\_\_\_\_, to improve weed control. For best results, apply quinclorac in combination with a methylated seed oil according to directions on the label.
- A. Quinclorac                D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl     F. None of the Above
10. \_\_\_\_\_ leaves, in comparison, are smooth or only sparsely hairy; and the leaf segment is longer, more rounded, and lance-shaped. The somewhat rounded terminal clusters of flower heads of western yarrow are normally white to cream-colored and have an extended bloom period from May to September.
- A. Autumn olive             D. Eurasian watermilfoil  
 B. Canada thistle            E. Common yarrow  
 C. Dalmatian toadflax      F. None of the Above

## Vine Section Alien Plant Invaders Topic 5

1. Akebia vines may also be dug up, removing as much of the roots as possible. To ensure its complete removal, regular monitoring and repeated cutting, digging or pulling is necessary. For large infestations, use of a labeled systemic herbicide, such as glyphosate (e.g., Roundup) or triclopyr (e.g., Garlon), is probably the most effective method to control akebia. An herbicidal soap, such as\_\_\_\_\_, which provides a burndown of plant tissues, may also provide some control.
- A. Triclopyr (e.g., Garlon)            D. Herbicide applications  
 B. Dithiopyr                            E. Pelargonic acid (e.g., Scythe)  
 C. Chlorpyralid (e.g. Transline)      F. None of the Above



2. Once established, the vine quickly overwhelms and destroys native vegetation by shading out smaller plants and outcompeting native vegetation for water and nutrients. Urban parks, with extensive wooded borders neighboring landscaped residential and private property, are especially vulnerable to invasion by \_\_\_\_\_.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

3. Clusters of small greenish flowers emerge from leaf axils, allowing each plant to produce large numbers of seeds. At maturity, globular, green to yellow fruits split open to reveal three red-orange, fleshy arils that contain the seeds. These showy fruits have made \_\_\_\_\_ very popular for use in floral arrangements.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet
- E. Fountain grass
- F. None of the Above

4. A variety of \_\_\_\_\_ are available for management of climbing euonymus. Grubbing, a rather labor intensive method, is effective for small populations or environmentally sensitive areas where herbicides cannot be used.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Mechanical and chemical methods
- F. None of the Above

5. Because English ivy is an evergreen vine, and remains active during the winter, \_\_\_\_\_ can be made to it any time of year as long as temperatures are above 55 or 60°Fahrenheit for a few days.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

6. Fall and winter applications will avoid or minimize impacts to many native plant species. Repeat \_\_\_\_\_ are likely to be needed and follow-up monitoring should be conducted to evaluate the success of treatments.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

7. Several \_\_\_\_\_ (e.g., glyphosate and triclopyr) move through the plant to the roots when applied to the leaves or stems and have been used effectively on Japanese honeysuckle.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

8. Local bird populations are important for dispersal under utility lines, bird feeders, fence lines and other perching locations. Other animals observed eating \_\_\_\_\_ fruits are chipmunks, squirrel and deer.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

9. Cut \_\_\_\_\_ can be fed to livestock, burned or enclosed in plastic bags and sent to a landfill. If conducted in the spring, cutting must be repeated as regrowth appears to exhaust the plant's stored carbohydrate reserves.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

10. \_\_\_\_\_ is effective at a concentration of 0.5% and is selective to plants in the aster, buckwheat, and pea families. Caution should be taken with chlorpyralid as groundwater pollution through leaching can be a problem with certain soil types. Do not apply spray so heavily that herbicide drips off the leaves.
- A. Triclopyr (e.g., Garlon)
  - B. Dithiopyr
  - C. Chlorpyralid (e.g. Transline)
  - D. Herbicide applications
  - E. Systemic herbicide(s)
  - F. None of the Above

## Trees- Alien Plant Invaders Topic 6

1. Establishing a thick cover of trees (preferably native and non-invasive) or grass sod will help shade out and discourage establishment of ailanthus seedlings. Targeting large female trees for control will help reduce spread of \_\_\_\_\_ by seed.
- A. Silk tree(s)
  - B. Ailanthus
  - C. Carrotwood
  - D. Princess tree(s)
  - E. Australian pine
  - F. None of the Above
2. \_\_\_\_\_ can be controlled using a variety of mechanical and chemical controls. Hand pulling may be effective for young seedlings. Plants should be pulled as soon as they are large enough to grasp.
- A. Silk tree(s)
  - B. Ailanthus
  - C. Carrotwood
  - D. Princess tree(s)
  - E. Australian pine
  - F. None of the Above
3. Princess tree seedlings and small trees can be controlled by applying a 2% solution of \_\_\_\_\_ or triclopyr (e.g., Garlon) and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.
- A. EPSP synthase
  - B. Dithiopyr
  - C. Nonglyphosate herbicides
  - D. Glyphosate (Roundup™)
  - E. Systemic herbicide
  - F. None of the Above
4. Because \_\_\_\_\_ spreads by suckering, resprouts are common after treatment. Cutting is an initial control measure and will require either an herbicidal control or repeated cutting for resprouts.
- A. Mimosa
  - B. Ailanthus
  - C. Carrotwood
  - D. Princess tree(s)
  - E. Australian pine
  - F. None of the Above
5. Whenever possible, efforts should be taken to prevent the introduction or encroachment of \_\_\_\_\_. For example, recently disturbed beach habitat may be planted with native vegetation to prevent Australian pine from invading.
- A. Silk tree(s)
  - B. Ailanthus
  - C. Carrotwood
  - D. Princess tree(s)
  - E. Australian pine
  - F. None of the Above
6. Clumps of seedlings suggest dispersal by small mammals. In its native range, \_\_\_\_\_ is pollinated by bees, which are the likely pollinators in Florida.
- A. Silk tree(s)
  - B. Ailanthus
  - C. Carrotwood
  - D. Princess tree(s)
  - E. Australian pine
  - F. None of the Above

7. \_\_\_\_\_ kills broadleaf (dicotyledonous) plants but causes little or no damage to grasses and is useful for areas where desirable grasses are to be maintained.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

8. Unfortunately, \_\_\_\_\_ seedlings often grow in low litter areas, unsuitable for frequent prescribed fire. In dense stands, seedlings and saplings may be cut and dropped on site, creating fuel for future fires.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

9. \_\_\_\_\_ seedlings appear vulnerable to fire, perhaps due to their poorly established root structure. Fire will top kill a mature plant, but resprouting does occur.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

10. Uprooting of 1/2 inch diameter seedlings by hand or up to 1 1/2 inch diameter using a weed wrench is effective, but care should be taken to avoid excessive disturbance to the soil, which can release \_\_\_\_\_ seeds stored in the soil.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

## Weed Management and Control Section Topic 7

1. \_\_\_\_\_ is necessary following mechanical or chemical control. Digging and chopping cause soil disturbance and desired plants need to be reestablished before the invader can get a foothold. The same is true of chemical control, the desired vegetation must be reestablished. Moreover, you must remember that the invader was able to gain a foothold under the management regime that had been in place on that land.

- A. Chemical control
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

### Cultural Control

2. Controlling weeds on such sites can be futile without \_\_\_\_\_, as weeds will readily re-invade the disturbed area.

- A. Chemical control
- B. Vegetative restoration
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

3. \_\_\_\_\_ are available as concentrated liquids, (2 to 8 lb/gal) which need to be mixed with water before applying; as wettable powders which are from 50 to 100% active ingredient and need to be dispersed in water for uniform application, or as granules which are from 1 to 10% active ingredient and which are applied dry with granular applicators. See the label for all instructions on labeled crops and timings.

- A. Weed control chemicals
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

4. Most effective control of \_\_\_\_\_ broadleaf weeds is obtained when applied in early fall (August 15–October 15) or in spring (May 1–June 1). For some weeds, repeated application at 20–30 day intervals may be required for control.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Summer annuals (AKA warm season annuals)
- F. None of the Above

5. \_\_\_\_\_ kill all plants, both desirable and undesirable. These herbicides can be used to spot treat perennial grassy weeds that are not affected by selective herbicides. To spot treat an area, thoroughly wet the weed foliage with herbicide solution.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Nonselective postemergence herbicides
- E. Systemic herbicides
- F. None of the Above

6. \_\_\_\_\_ is referred to as a desiccant because it causes a leaf or an entire plant to dry out quickly. It is used to desiccate potato vines and seed crops, to control flowering of sugarcane, and for industrial and aquatic weed control. It is not residual; that is, it does not leave any trace of herbicide on or in plants, soil, or water.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Diquat dibromide
- F. None of the Above

7. The product Agent Orange, used extensively throughout Vietnam, was about 50% 2,4-D. However, the controversies associated with the use of Agent Orange were associated with a contaminant (\_\_\_\_\_ ) in the 2,4,5-T component of the defoliant.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Dioxin
- F. None of the Above

**Imazapyr** (Trade name Habitat®).

8. Although imazapyr is a \_\_\_\_\_, a good applicator can somewhat selectively remove targeted plants by focusing the spray only on the plants to be removed.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

### **Persistence of Pesticides**

9. Persistence refers to the length of time a pesticide remains in the environment. This depends on how quickly it breaks down (degrades), which is largely a function of its \_\_\_\_\_. Persistence is usually expressed as the "half-life" (T1/2) of a pesticide.

- A. Chemical control
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

10. Pesticides can be degraded by sunlight (photodecomposition), high air or water temperatures (thermal degradation), moisture conditions, biological action (microbial decay), and soil conditions (pH). \_\_\_\_\_ break down slowly and may be more available to aquatic animals.

- A. Persistent (long-lasting) pesticides
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (short-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

## Introduction to Wetlands Section Topic 8

### Filamentous Algae

1. Unlike microscopic algae, \_\_\_\_\_ are frequently a problem in pond management and are usually visible to the naked eye as a floating mat of thread-like filaments often called "pond moss". They usually begin growth on the pond bottom in shallow water, later float to the surface and may completely cover the pond surface.
- A. Filamentous algae
  - B. Hydrilla
  - C. Water hyacinths
  - D. Parrotfeather
  - E. Eurasian watermilfoil
  - F. None of the Above

### Biological Control

2. Grass carp are not very effective at controlling \_\_\_\_\_, except at very high densities. Grass carp do not control planktonic algae.
- A. Water lettuce
  - B. Hydrilla
  - C. Water hyacinths
  - D. Parrotfeather
  - E. Eurasian watermilfoil
  - F. None of the Above

### Economic Importance

3. \_\_\_\_\_ are a severe environmental and economic problem in all of the gulf coast states and in many other areas of the world with a sub-tropical or tropical climate. This species has rapidly spread throughout inland and coastal freshwater bays, lakes, and marshes in the United States and in other countries.
- A. Water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Alders
  - E. Eurasian watermilfoil
  - F. None of the Above
4. When big floating bladderwort is flowering it is easily distinguished from its native cousins by large spoke-like floats that radiate out from the base of the flower stalk. During the rest of the year, however, it can be confused with \_\_\_\_\_, both of which are rather robust and can appear almost bushy underwater.
- A. Water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Common bladderwort
  - E. Eurasian watermilfoil
  - F. None of the Above

### Control

5. Years of research to find insect biocontrols has resulted in the successful introduction of two insects which are believed to be helpful in keeping water lettuce under maintenance control in many places; however, biocontrol fish which are able to control submersed plants are ineffective against the \_\_\_\_\_.
- A. Floating water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Algae
  - E. Eurasian watermilfoil
  - F. None of the Above
6. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.
- A. Glyphosate herbicides
  - B. Dithiopyr
  - C. Nonglyphosate herbicides
  - D. Broad spectrum, non-selective herbicides
  - E. Systemic herbicides
  - F. None of the Above

7. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. \_\_\_\_\_ (see the label) will have to be added to the glyphosate solution for good results.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

8. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of \_\_\_\_\_.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Triclopyr
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

9. \_\_\_\_\_ benefit other plants growing near them by taking nitrogen out of the air and depositing it in the soil in usable form; fallen alder leaves make very rich compost.

- A. Water lettuce
- B. Big floating bladderwort
- C. Water hyacinths
- D. Alders
- E. Eurasian watermilfoil
- F. None of the Above

10. One danger with any chemical control method is the chance of oxygen depletion after the treatment caused by the decomposition of the dead plant material. \_\_\_\_\_ depletions can kill fish in the pond. If the pond is heavily infested with weeds it may be possible (depending on the herbicide chosen) to treat the pond in sections and let each section decompose for about two weeks before treating another section. Aeration, particularly at night, for several days after treatment may help control the oxygen depletion.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

## Submersed (underwater) Aquatic Weed Section Topic 9

1. Renovate is a liquid triclopyr formulation that is effective on \_\_\_\_\_. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

2. A variety of physical, chemical, and biological control methods have been used in attempts to manage infestations of \_\_\_\_\_. Unfortunately, complete eradication is rare.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

3. Navigate and Aqua-Kleen is a granular butoxyethyl ester of 2,4-D and has been effective on Eurasian watermilfoil. \_\_\_\_\_ are systemic herbicides. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. 2,4-D compounds
- F. None of the Above

4. Reward is a liquid diquat formulation that has been effective on Eurasian watermilfoil and is very effective if mixed with a copper compound. It is a contact herbicide. \_\_\_\_\_ act quickly and kill all plants cells that they contact.

- A. Systemic herbicide(s)
- B. Liquid formulation
- C. Liquid diquat formulation
- D. Contact herbicides
- E. Copper
- F. None of the Above

5. Renovate is a \_\_\_\_\_ that is effective on Eurasian watermilfoil. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Lliquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

6. Aquathol, Aquathol K, and Aquathol Super K are \_\_\_\_\_ and comes in both liquid and granular formulations. These endothall products have been effective on Eurasian watermilfoil and can be mixed with copper compounds for additional effectiveness. Contact herbicides act quickly and kill all plant cells that they contact.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid diquat formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Dipotassium salts of endothall
- F. None of the Above

7. Sonar and Avast are fluridone compounds, come in both liquid and granular formulations, and have been effective on Eurasian watermilfoil. These are broad spectrum, systemic herbicides. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid diquat formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. Copper
- F. None of the Above

8. Any aquatic plant identified as \_\_\_\_\_ should be sent to a specialist for positive identification since hydrilla is such a serious threat to fresh water habitats. It is only through early identification and concentrated control methods that there is any hope of eliminating hydrilla. Fishermen or boaters in waters known to have hydrilla should make every effort not to accidentally transport hydrilla from one lake or pond to another.

- A. Water lettuce
- B. Hydrilla
- C. Egeria, elodea, or hydrilla
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

### Pond Water Chemistry

9. The water hardness also should be considered when using herbicides containing copper. Water hardness--Generally, water hardness is a measure of the \_\_\_\_\_ in the water. In hard waters (above 50 parts per million hardness) it may be necessary to apply greater amounts of herbicide in order to achieve control. In soft waters (below 50 parts per million hardness) some herbicides are more toxic to fish and plants.

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

10. Copper--In soft water some heavy metals, especially \_\_\_\_\_, can be toxic to fish. Some herbicides contain copper and should be used with caution in soft water ponds (less than 50 parts per million water hardness).

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

## Aquatic Herbicides and Controls Section Topic 10

1. \_\_\_\_\_ is used as a defoliant for a wide range of crops and as a herbicide for both terrestrial and aquatic weeds.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Endothall
- E. Systemic herbicide
- F. None of the Above

2. Field and laboratory tests show that \_\_\_\_\_ usually remains in the top inch of soil for long periods of time after it is applied.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

3. Glyphosate itself is an acid, but it is commonly used in salt form, most commonly the isopropylamine salt. It may also be available in \_\_\_\_\_. It is generally distributed as water-soluble concentrates and powders.

- A. Glyphosate herbicides
- B. Acidic or trimethylsulfonium salt forms
- C. Nonglyphosate herbicides
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicides
- F. None of the Above

4. Some formulations of \_\_\_\_\_ are highly toxic to fish while others are less so. For example, the LC50 ranges between 1.0 and 100 mg/L in cutthroat trout, depending on the formulation used. Channel catfish had less than 10% mortality when exposed to 10 mg/L for 48 hours.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

5. \_\_\_\_\_ can be effective for spot treatment of Eurasian watermilfoil and is relatively selective to Eurasian watermilfoil when used at the labeled rate.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Triclopyr
- E. Systemic herbicide
- F. None of the Above

6. \_\_\_\_\_ can show good control of submersed plants where there is little water movement and an extended time for the treatment. Its use is most applicable to whole-lake or isolated bay treatments where dilution can be minimized. It is not effective for spot treatments of areas less than five acres.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

7. Most species of algae can be controlled with very low concentrations of \_\_\_\_\_. It is available in crystalline nuggets the size of rock salt or as a finely ground "snow" grade.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Copper sulfate
- E. Cutrine Plus
- F. None of the Above

8. \_\_\_\_\_, under field conditions, is effective in controlling a broad range of algae including Chara, Spirogyra, Cladophora, Vaucheria, Ulothrix, Microcystis, and Oscillatoria. Effective in hard water.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Cutrine Plus
- E. Copper sulfate
- F. None of the Above



9. \_\_\_\_\_ is a concentrated liquid aquatic herbicide effective against a wide variety of submersed, emergent, and floating aquatic plants including duckweed, naiads, and cattails.
- A. Reward
  - B. Fluridone
  - C. 2,4-D
  - D. A concentrated liquid aquatic herbicide
  - E. Diquat
  - F. None of the Above

10. \_\_\_\_\_ poses virtually no environmental risk in aquatic applications because the herbicide concentration rapidly decreases as it is absorbed onto soil, vegetation, and organic matter.
- A. Glyphosate herbicide
  - B. Dithiopyr
  - C. Nonglyphosate herbicide
  - D. Reward
  - E. Systemic herbicide
  - F. None of the Above

## Invasive Plant Rule Section Topic 11

### Harm and impact

1. Finally, a plant is deemed to be invasive if it causes negative environmental, economic, or human health effects, which outweigh any beneficial effects. For example, yellow starthistle is a source of nectar for bee producers. But the displacement of native and other desirable plant species caused by yellow starthistle leads to dramatically decreased forage for wildlife and livestock, which severely disrupts the profitability of associated businesses. \_\_\_\_\_ greatly overshadow the positive effects and thus, define harm caused by yellow starthistle and explain why it is considered an invasive species.
- A. Population of non-native plants
  - B. An invasive species
  - C. Non-selective herbicides
  - D. These negative effects
  - E. Application of any pesticide
  - F. None of the Above

### California

2. Invasive plants are one of the most serious environmental issues facing California. They disrupt ecosystems by altering physical processes, displacing native plants, and degrading wildlife habitat. The California Invasive Plant Inventory is a vital resource for those working to protect the state's natural areas. The Inventory summarizes the impacts, potential for spread, and distribution of more than 200 \_\_\_\_\_ that invade wildlands in California.
- A. Population of non-native plants
  - B. Invasive species
  - C. Non-native plant(s)
  - D. Noxious weed(s)
  - E. Alien plant(s)
  - F. None of the Above

### Herbicide and Insecticide Safety Precautions

3. The Federal Environmental Pesticide Control Act of 1972 in part prohibits the application of any pesticide in a manner inconsistent with its labeling. This means that a pesticide cannot be used unless it is registered for the specific pest. Consequently, \_\_\_\_\_ formerly used by homeowners and pesticide applicators can no longer be used legally.
- A. Ester(s)
  - B. 2,4 D
  - C. Insecticide(s)
  - D. 2,4-D, 2,4,5-T, 2,4-DB, 2,4,5-TP (Silvex) and MCPA
  - E. Non-selective herbicides
  - F. None of the Above
4. The pesticide **APPLICATOR** is always responsible for the effects of \_\_\_\_\_ as well as problems caused by residues that drift from the application site to other property. Always read and carefully follow instructions on the product label.
- A. Herbicide volatility
  - B. Several barriers
  - C. Altering physical processes
  - D. Insecticide(s)
  - E. Pesticide residues
  - F. None of the Above

5. When using \_\_\_\_\_, always avoid prolonged chemical contact with skin. Wash exposed skin areas with generous amounts of soap and water. Launder clothing worn during application in hot water using a phosphate detergent.

- A. Phenoxy herbicide(s)
- B. Pesticides
- C. Herbicide(s)
- D. Lower pressure drift pesticide
- E. Safe insecticide
- F. None of the Above

6. Do not contaminate food, dishes, utensils or food preparation areas with \_\_\_\_\_. Any contaminated food should be discarded, and dishes and utensils should be thoroughly washed.

- A. Phenoxy herbicide(s)
- B. Non-selective herbicides
- C. Herbicide(s)
- D. Insecticide
- E. Safe insecticide
- F. None of the Above

7. All herbicides can be classified as either selective or nonselective. \_\_\_\_\_ kill certain weeds with little or no injury to the crop. It is the difference in plant response that determines the effectiveness of the herbicide and safety to the crop.

- A. Phenoxy herbicide(s)
- B. Nonselective herbicide(s)
- C. Herbicide (s)
- D. Selective herbicides
- E. Insecticide(s)
- F. None of the Above

8. \_\_\_\_\_ are those which will kill or injure virtually all kinds of vegetation.

- A. Phenoxy herbicide(s)
- B. Nonselective herbicide(s)
- C. Herbicide(s)
- D. Selective herbicides
- E. Insecticide(s)
- F. None of the Above

9. The risk of drift is great when the application is by foliar spray. When the soil is treated, a hazard may arise from the herbicide persisting in the soil longer than intended and interfering with growing a crop at some later time. The movement of a \_\_\_\_\_ by runoff or by soil erosion to non-target areas is another possibility. Typical 2,4 D injury symptoms on grape leaves.

- A. Phenoxy herbicide(s)
- B. Nonselective herbicide(s)
- C. Herbicide(s)
- D. Selective herbicides
- E. Insecticide(s)
- F. None of the Above

10. Growers of sensitive crops are not obligated to inform operators of surrounding farms and local industries of the presence and sensitivity of their crops, but it is advisable to seek the cooperation of neighbors in the use of \_\_\_\_\_. Reporting incidents of pesticide damage. Two governmental agencies may exercise regulatory powers in situations of herbicide misuse.

- A. Phenoxy herbicide(s)
- B. Hazardous pesticides
- C. Non-selective herbicides
- D. Greater concentrations of the herbicide(s)
- E. Registration and labeling of a particular pesticide(s)
- F. None of the Above

You are finished with your assignment. Please fax this answer key and your registration page along with the customer survey to TLC.

**If you are a California DPR student, we will require a photocopy of your driver's license.**

Fax Number (928) 272-0747 Always call us after faxing the paperwork to ensure that we've received it. Allow two weeks for processing and for the proper DPR forms to be sent back to you. If you need this course graded and your certificate sooner, add a \$50.00 rush fee. This may not include postage charges.

# Invasive Plant Identification CEU Conventional Assignment Supplemental Exam

You will have 90 days from the start of this course to have successfully completed this CEU assignment with a score of 70%. You may e-mail the answers to TLC, info@tlch2o.com, you can also find a copy of this assignment in Word on the Assignment Page on TLC's website or fax the answers to TLC (928) 468-0675. Write your answers on the Answer Key found in the front of first assignment.

**Write your answers on the Answer Key found in the front section of this assignment.**

## Weed Identification Section Topic 1

(s) Means the answer can be plural or singular.

1. To maintain \_\_\_\_\_ in ensuing generations, little to no selection is done during the ecovar development process.

- A. Genetic diversity
- B. Ecovar development process
- C. Minimum levels of pesticide
- D. Direct habitat destruction
- E. Negative environmental effects
- F. None of the Above

2. The roasted seed has been used as a coffee substitute. It is also a very important food plant for the caterpillars of many butterflies. In the spring, basal \_\_\_\_\_ emerge from a stout taproot. These elongated leaves have wavy margins, thus the name "curly" dock. In summer, the plant has reddish, rigid stems, 2-4 feet tall. Flower stems have greenish flowers.

- A. Rosettes
- B. Mid-ribs
- C. Flowers
- D. Spikes
- E. Leaves
- F. None of the Above

3. Milkweed plants, members of the Asclepias family, are the only host plant for the monarch and queen butterflies. The adult females seek out these plants on which they lay their eggs. The caterpillars that hatch will remain on the plants and eat the leaves until they enter the pupal stage, then emerge as adult butterflies. It is a \_\_\_\_\_ herb with long-spreading rhizomes.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

4. Invasions of non-native plants are the \_\_\_\_\_ after direct habitat destruction.

- A. Genetic diversity
- B. Ecovar development process
- C. Minimum levels of pesticide
- D. Direct habitat destruction
- E. Negative environmental effects
- F. None of the Above

5. Puncture vine is a prostrate, mat-forming \_\_\_\_\_. It has small leaflets and small yellow flowers with 5 petals.

- A. Perennial
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

6. \_\_\_\_\_ weeds germinate from seed, grow, flower, and produce seed in less than one year.

- A. Winter annual(s)
- B. Summer annual(s)
- C. Biennial(s)
- D. Summer and winter annual(s)
- E. Annual(s)
- F. None of the Above

7. \_\_\_\_\_ germinate in the fall, overwinter as seedlings or small rosettes and mature, set seed and die the following spring or early summer.

- A. Winter annual(s)      D. Summer and winter annual(s)
- B. Perennial              E. Annual(s)
- C. Biennial(s)            F. None of the Above

8. The key is to use pesticides in a way that complements rather than hinders \_\_\_\_\_ in the strategy and which also limits negative environmental effects.

- A. Other elements                      D. Direct habitat destruction
- B. Ecovar development process      E. Negative environmental effects
- C. Minimum levels of pesticide      F. None of the Above

9. \_\_\_\_\_ are maintained via controlled pollination or vegetative means, so that cultivar characteristics are passed to ensuing generations.

- A. Cultivars                              D. Direct habitat destruction
- B. Ecovar development process(s)   E. Negative environmental effect(s)
- C. Minimum levels of pesticide(s)   F. None of the Above

10. Curly dock is a \_\_\_\_\_ weed in the buckwheat family. Fairly pleasant tasting, the leaves are very rich in vitamins, especially vitamins A and C, and can be eaten raw or cooked.

- A. Perennial                      D. Summer and winter annual(s)
- B. Summer annual(s)      E. Annual(s)
- C. Biennial(s)                  F. None of the Above

## Invasive Plant Species Introduction Topic 2

1. \_\_\_\_\_ is a perennial with erect, smooth, herbaceous stems that are less than 2 feet tall and emerge in clumps from a spreading root system. Soft, gray-green leaves, which are 1 to 1 1/2 inches long and narrow, are crowded onto each stem.

- A. Leafy spurge              D. Toadflax
- B. Spurge laurel              E. Scotch thistle
- C. Russian thistle          F. None of the Above

2. This plant has stems that terminate with clusters of 15 to 20 snapdragon-like flowers that are about 1 inch long and yellow. Gently pinching the sides of a flower opens its 2 lips revealing an orange throat that acts as a guide for insects to nectar produced in the spur. The plant reproduces by seeds and creeping roots.

- A. Snapdragon              D. Toadflax
- B. Spurge laurel              E. Autumn olive
- C. Russian thistle          F. None of the Above

3. The broad and pointed \_\_\_\_\_ leaves can be mistaken for Broadleaf dock (*Rumex obtusifolia*), but docks lack rhizomes and the tall, spreading habit of Japanese knotweed. Other less invasive relatives (such as *P. virginianum*) grow from similar rhizomes and are difficult to eradicate.

- A. Canada thistle              D. Toadflax
- B. Japanese knotweed      E. Autumn olive
- C. Russian thistle              F. None of the Above

4. \_\_\_\_\_ is difficult to control. Its extensive root system has vast nutrient stores that let it recover from control attempts. Combine control methods into a system to achieve best results.

- A. Leafy spurge              D. Toadflax
- B. Spurge laurel              E. Scotch thistle
- C. Russian thistle              F. None of the Above

5. As an annual, \_\_\_\_\_ reproduces solely by seed. Seeds generally do not remain viable past one year. Repeated hoeing, tilling, or mowing of young plants will prevent seed production. Hand-pulling (with gloves) can also be effective for small infestations.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

6. \_\_\_\_\_ has elliptic to lanceolate leaves, its branches are usually thorny, and its fruit is yellow, dry and mealy.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

7. Combining control methods is the best form of \_\_\_\_\_ management. Persistence is imperative so the weed is continually stressed, forcing it to exhaust root nutrient stores and eventually die.

- A. Canada thistle
- B. Japanese knotweed
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

8. \_\_\_\_\_ was easy to establish and homesteaders liberally landscaped their properties with this drought resistant plant, continually spreading it in their migration to the Western frontier. Also, burial sites were often adorned with toadflax to give everlasting beauty and tranquility. Their legacy has prevailed, proving to be notorious in nature.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

9. \_\_\_\_\_ is a branched, robust biennial (or sometimes annual) that often grows 8 feet or more in height and 6 feet in width. Main stems may be up to 4 inches wide at the base. Stems have vertical rows of prominent, spiny, ribbon-like leaf material or "wings" that extend to the base of the flower heads.

- A. Leafy spurge
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Scotch thistle
- F. None of the Above

10. \_\_\_\_\_ is an attractive ornamental plant known for its spiraling evergreen leaves and greenish-yellow, bitter-fragrant flowers. Larger patches of this species emit a strong unpleasant odor. Flowering occurs in late winter-early spring, producing clusters of blue berries during the spring.

- A. Snapdragon
- B. Spurge laurel
- C. Russian thistle
- D. Toadflax
- E. Autumn olive
- F. None of the Above

## Commonly Found Invasive and/or Noxious Weeds - Topic 3

1. Multiple treatments are necessary every year for several years, making leafy spurge control an extremely expensive undertaking. If left uncontrolled for a single year, \_\_\_\_\_ can re-infest rapidly. Prescribed burning, in conjunction with herbicides, may also be effective.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Leafy spurge
- E. Canada thistle
- F. None of the Above

2. The addition of a non-ionic surfactant at a concentration of 0.5% improves the effectiveness of foliar treatments. \_\_\_\_\_ have been shown to be effective in controlling Chinese lespedeza.

- A. Triclopyr (e.g., Garlon)
- B. Triclopyr and clopyralid
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

3. \_\_\_\_\_ plants grow from four to ten feet high, depending upon conditions, and produce a showy display of magenta-colored flower spikes throughout much of the summer. Flowers have five to seven petals. Mature plants can have from 30 to 50 stems arising from a single rootstock.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

4. Musk thistle rosettes are usually large and compact with a large, corky taproot that is hollow near the \_\_\_\_\_. Leaves have consistent shape, sometimes expressing a frosted appearance around the leaf margins, and often have a cream-colored midrib.

- A. Rosettes
- B. Mid-rib
- C. Flowers
- D. Crown
- E. Leaves
- F. None of the Above

5. Musk thistle flowers and starts to produce seed 45 to 55 days after it bolts. Musk thistle has very large bracts beneath flowers that are armed with sharp spines and shoots beneath flowers are almost devoid of \_\_\_\_\_.

- A. Rosettes
- B. Mid-ribs
- C. Flowers
- D. Spikes
- E. Leaves
- F. None of the Above

6. \_\_\_\_\_ will not tolerate tillage and can be removed easily by severing its root below ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

7. First year \_\_\_\_\_ plants are low-growing rosettes of bluish gray-green, felt-like leaves that range from 4-12 inches in length and 1-5 inches in width.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

8. Exotic grasses have become one of the most insidious problems in the field of wildlife management, because they can totally dominate pasture and prairie lands once established, having little wildlife value and leaving no room for native plants. Repeated applications of \_\_\_\_\_ are required for control.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Chemical applications
- E. Herbicide(s)
- F. None of the Above

9. In natural areas where Canada thistle is interspersed with desirable native plants, targeted application of a systemic herbicide such as \_\_\_\_\_, which carries plant toxins to the roots, may be effective.

- A. Triclopyr (e.g., Garlon)
- B. Glyphosate (e.g., Roundup or Rodeo)
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

10. \_\_\_\_\_ raises fuel loads, which increases the intensity and spread of a fire, and results in severe damage to native, dry forest species adapted to less extreme fire regimes.

- A. Mullein
- B. Fountain grass
- C. Loosestrife
- D. Chinese lespedeza
- E. Canada thistle
- F. None of the Above

## Herbs and Related Invasive Species Topic 4

1. When glyphosate is applied to susceptible plants, glyphosate blocks EPSP synthase preventing the production of essential amino acids and the plant dies. However, in plants that are Roundup Ready, a modified EPSP synthase is unaffected by glyphosate and allows the plant to continue growing. There is little or no crop injury associated with \_\_\_\_\_ application and Roundup Ready alfalfa.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

2. If the glyphosate application is made after the \_\_\_\_\_, some yield loss may occur due to the competitive effects of the weed on the crop; in other words, the damage has already been done.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

3. Rotation to non-Roundup Ready crops using \_\_\_\_\_ after Roundup Ready crops is also effective in reducing the potential for glyphosate-resistant weeds.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate
- E. Systemic herbicide
- F. None of the Above

4. \_\_\_\_\_ is most commonly used. However, herb Robert often occurs initially as part of a mosaic alongside desirable native species. In these situations, alternative control methods that have the ability to target individual plants can more successfully meet all goals of a project.

- A. EPSP synthase
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

5. Grass Family (Poaceae). Toothache grass is a \_\_\_\_\_.
- A. Winter annual            D. Warm-season, perennial bunch grass  
 B. Summer annual        E. Cold season perennial bunch grass  
 C. Biennial grass        F. None of the Above
6. \_\_\_\_\_ is a postemergence herbicide that is slowly translocated within the plant. It can effectively control tillered crabgrass with a single application.
- A. Quinclorac                    D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                    E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl        F. None of the Above
7. \_\_\_\_\_ acts as a preemergence and postemergence herbicide. It provides postemergence control of crabgrass only up to the one-tiller stage of development, but it can be combined with fenoxaprop-p-ethyl when two or more tillers are present.
- A. Quinclorac                    D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                    E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl        F. None of the Above
8. \_\_\_\_\_ is a postemergence herbicide effective in controlling crabgrass and some broadleaf weeds.
- A. Quinclorac                    D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                    E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl        F. None of the Above
9. Quinclorac can be mixed with other herbicides, including \_\_\_\_\_, to improve weed control. For best results, apply quinclorac in combination with a methylated seed oil according to directions on the label.
- A. Quinclorac                    D. Pendimethalin and phenoxy herbicides  
 B. Dithiopyr                    E. Systemic herbicide  
 C. Fenoxaprop-p-ethyl        F. None of the Above
10. \_\_\_\_\_ leaves, in comparison, are smooth or only sparsely hairy; and the leaf segment is longer, more rounded, and lance-shaped. The somewhat rounded terminal clusters of flower heads of western yarrow are normally white to cream-colored and have an extended bloom period from May to September.
- A. Autumn olive                D. Eurasian watermilfoil  
 B. Canada thistle              E. Common yarrow  
 C. Dalmatian toadflax        F. None of the Above

## Vine Section Alien Plant Invaders Topic 5

1. Because English ivy is an evergreen vine, and remains active during the winter, \_\_\_\_\_ can be made to it any time of year as long as temperatures are above 55 or 60°Fahrenheit for a few days.
- A. Triclopyr (e.g., Garlon)            D. Herbicide applications  
 B. Dithiopyr                              E. Systemic herbicide(s)  
 C. Chlorpyralid (e.g. Transline)      F. None of the Above
2. Fall and winter applications will avoid or minimize impacts to many native plant species. Repeat \_\_\_\_\_ are likely to be needed and follow-up monitoring should be conducted to evaluate the success of treatments.
- A. Triclopyr (e.g., Garlon)            D. Herbicide applications  
 B. Dithiopyr                              E. Systemic herbicide(s)  
 C. Chlorpyralid (e.g. Transline)      F. None of the Above



3. Several \_\_\_\_\_ (e.g., glyphosate and triclopyr) move through the plant to the roots when applied to the leaves or stems and have been used effectively on Japanese honeysuckle.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Systemic herbicide(s)
- F. None of the Above

4. Akebia vines may also be dug up, removing as much of the roots as possible. To ensure its complete removal, regular monitoring and repeated cutting, digging or pulling is necessary. For large infestations, use of a labeled systemic herbicide, such as glyphosate (e.g., Roundup) or triclopyr (e.g., Garlon), is probably the most effective method to control akebia. An herbicidal soap, such as \_\_\_\_\_, which provides a burndown of plant tissues, may also provide some control.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Pelargonic acid (e.g., Scythe)
- F. None of the Above

5. Once established, the vine quickly overwhelms and destroys native vegetation by shading out smaller plants and outcompeting native vegetation for water and nutrients. Urban parks, with extensive wooded borders neighboring landscaped residential and private property, are especially vulnerable to invasion by \_\_\_\_\_.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

6. Clusters of small greenish flowers emerge from leaf axils, allowing each plant to produce large numbers of seeds. At maturity, globular, green to yellow fruits split open to reveal three red-orange, fleshy arils that contain the seeds. These showy fruits have made \_\_\_\_\_ very popular for use in floral arrangements.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet
- E. Fountain grass
- F. None of the Above

7. A variety of \_\_\_\_\_ are available for management of climbing euonymus. Grubbing, a rather labor intensive method, is effective for small populations or environmentally sensitive areas where herbicides cannot be used.

- A. Triclopyr (e.g., Garlon)
- B. Dithiopyr
- C. Chlorpyralid (e.g. Transline)
- D. Herbicide applications
- E. Mechanical and chemical methods
- F. None of the Above

8. Local bird populations are important for dispersal under utility lines, bird feeders, fence lines and other perching locations. Other animals observed eating \_\_\_\_\_ fruits are chipmunks, squirrel and deer.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

9. Cut \_\_\_\_\_ can be fed to livestock, burned or enclosed in plastic bags and sent to a landfill. If conducted in the spring, cutting must be repeated as regrowth appears to exhaust the plant's stored carbohydrate reserves.

- A. Mile-a-minute weed
- B. Kudzu
- C. Porcelainberry
- D. Climbing bittersweet vine (*Celastrus scandens*)
- E. Fountain grass
- F. None of the Above

10. \_\_\_\_\_ is effective at a concentration of 0.5% and is selective to plants in the aster, buckwheat, and pea families. Caution should be taken with chlorpyralid as groundwater pollution through leaching can be a problem with certain soil types. Do not apply spray so heavily that herbicide drips off the leaves.
- |                                  |                           |
|----------------------------------|---------------------------|
| A. Triclopyr (e.g., Garlon)      | D. Herbicide applications |
| B. Dithiopyr                     | E. Systemic herbicide(s)  |
| C. Chlorpyralid (e.g. Transline) | F. None of the Above      |

## Trees- Alien Plant Invaders Topic 6

1. Establishing a thick cover of trees (preferably native and non-invasive) or grass sod will help shade out and discourage establishment of ailanthus seedlings. Targeting large female trees for control will help reduce spread of \_\_\_\_\_ by seed.
- |                 |                      |
|-----------------|----------------------|
| A. Silk tree(s) | D. Princess tree(s)  |
| B. Ailanthus    | E. Australian pine   |
| C. Carrotwood   | F. None of the Above |
2. \_\_\_\_\_ can be controlled using a variety of mechanical and chemical controls. Hand pulling may be effective for young seedlings. Plants should be pulled as soon as they are large enough to grasp.
- |                 |                      |
|-----------------|----------------------|
| A. Silk tree(s) | D. Princess tree(s)  |
| B. Ailanthus    | E. Australian pine   |
| C. Carrotwood   | F. None of the Above |
3. Princess tree seedlings and small trees can be controlled by applying a 2% solution of \_\_\_\_\_ or triclopyr (e.g., Garlon) and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.
- |                             |                          |
|-----------------------------|--------------------------|
| A. EPSP synthase            | D. Glyphosate (Roundup™) |
| B. Dithiopyr                | E. Systemic herbicide    |
| C. Nonglyphosate herbicides | F. None of the Above     |
4. Because \_\_\_\_\_ spreads by suckering, resprouts are common after treatment. Cutting is an initial control measure and will require either an herbicidal control or repeated cutting for resprouts.
- |               |                      |
|---------------|----------------------|
| A. Mimosa     | D. Princess tree(s)  |
| B. Ailanthus  | E. Australian pine   |
| C. Carrotwood | F. None of the Above |
5. Whenever possible, efforts should be taken to prevent the introduction or encroachment of \_\_\_\_\_. For example, recently disturbed beach habitat may be planted with native vegetation to prevent Australian pine from invading.
- |                 |                      |
|-----------------|----------------------|
| A. Silk tree(s) | D. Princess tree(s)  |
| B. Ailanthus    | E. Australian pine   |
| C. Carrotwood   | F. None of the Above |
6. Clumps of seedlings suggest dispersal by small mammals. In its native range, \_\_\_\_\_ is pollinated by bees, which are the likely pollinators in Florida.
- |                 |                      |
|-----------------|----------------------|
| A. Silk tree(s) | D. Princess tree(s)  |
| B. Ailanthus    | E. Australian pine   |
| C. Carrotwood   | F. None of the Above |

7. \_\_\_\_\_ kills broadleaf (dicotyledonous) plants but causes little or no damage to grasses and is useful for areas where desirable grasses are to be maintained.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

8. Unfortunately, \_\_\_\_\_ seedlings often grow in low litter areas, unsuitable for frequent prescribed fire. In dense stands, seedlings and saplings may be cut and dropped on site, creating fuel for future fires.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

9. \_\_\_\_\_ seedlings appear vulnerable to fire, perhaps due to their poorly established root structure. Fire will top kill a mature plant, but resprouting does occur.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

10. Uprooting of 1/2 inch diameter seedlings by hand or up to 1 1/2 inch diameter using a weed wrench is effective, but care should be taken to avoid excessive disturbance to the soil, which can release \_\_\_\_\_ seeds stored in the soil.

- A. Buckthorn
- B. Ailanthus
- C. Carrotwood
- D. Princess tree(s)
- E. Australian pine
- F. None of the Above

## Weed Management and Control Section Topic 7

1. \_\_\_\_\_ is necessary following mechanical or chemical control. Digging and chopping cause soil disturbance and desired plants need to be reestablished before the invader can get a foothold. The same is true of chemical control, the desired vegetation must be reestablished. Moreover, you must remember that the invader was able to gain a toehold under the management regime that had been in place on that land.

- A. Chemical control
- B. Environmental and economic problem
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

2. Controlling weeds on such sites can be futile without \_\_\_\_\_, as weeds will readily re-invade the disturbed area.

- A. Chemical control
- B. Vegetative restoration
- C. Persistence
- D. Persistent (long-lasting) pesticides
- E. Pesticide remains in the environment
- F. None of the Above

3. \_\_\_\_\_ are available as concentrated liquids, (2 to 8 lb/gal) which need to be mixed with water before applying; as wettable powders which are from 50 to 100% active ingredient and need to be dispersed in water for uniform application, or as granules which are from 1 to 10% active ingredient and which are applied dry with granular applicators. See the label for all instructions on labeled crops and timings.

- A. Weed control chemicals
- B. Dithiopyr
- C. Nonglyphosate herbicides
- D. Glyphosate (Roundup™)
- E. Systemic herbicide
- F. None of the Above

4. Most effective control of \_\_\_\_\_ broadleaf weeds is obtained when applied in early fall (August 15–October 15) or in spring (May 1–June 1). For some weeds, repeated application at 20–30 day intervals may be required for control.
- A. Perennial                      D. Summer and winter annual(s)  
 B. Summer annual(s)      E. Summer annuals (AKA warm season annuals)  
 C. Biennial(s)                  F. None of the Above
5. \_\_\_\_\_ kill all plants, both desirable and undesirable. These herbicides can be used to spot treat perennial grassy weeds that are not affected by selective herbicides. To spot treat an area, thoroughly wet the weed foliage with herbicide solution.
- A. Triclopyr                      D. Nonselective postemergence herbicides  
 B. Dithiopyr                      E. Systemic herbicides  
 C. Nonglyphosate herbicides      F. None of the Above
6. \_\_\_\_\_ is referred to as a desiccant because it causes a leaf or an entire plant to dry out quickly. It is used to desiccate potato vines and seed crops, to control flowering of sugarcane, and for industrial and aquatic weed control. It is not residual; that is, it does not leave any trace of herbicide on or in plants, soil, or water.
- A. Triclopyr                      D. Glyphosate (Roundup™)  
 B. Dithiopyr                      E. Diquat dibromide  
 C. Nonglyphosate herbicides      F. None of the Above
7. The product Agent Orange, used extensively throughout Vietnam, was about 50% 2,4-D. However, the controversies associated with the use of Agent Orange were associated with a contaminant (\_\_\_\_\_ ) in the 2,4,5-T component of the defoliant.
- A. Triclopyr                      D. Glyphosate (Roundup™)  
 B. Dithiopyr                      E. Dioxin  
 C. Nonglyphosate herbicides      F. None of the Above
8. Although imazapyr is a \_\_\_\_\_, a good applicator can somewhat selectively remove targeted plants by focusing the spray only on the plants to be removed.
- A. Glyphosate herbicide              D. Broad spectrum, non-selective herbicide  
 B. Dithiopyr                      E. Systemic herbicide  
 C. Nonglyphosate herbicide      F. None of the Above
9. Persistence refers to the length of time a pesticide remains in the environment. This depends on how quickly it breaks down (degrades), which is largely a function of its \_\_\_\_\_. Persistence is usually expressed as the "half-life" (T<sub>1/2</sub>) of a pesticide.
- A. Chemical control                      D. Persistent (long-lasting) pesticides  
 B. Environmental and economic problem      E. Pesticide remains in the environment  
 C. Persistence                      F. None of the Above
10. Pesticides can be degraded by sunlight (photodecomposition), high air or water temperatures (thermal degradation), moisture conditions, biological action (microbial decay), and soil conditions (pH). \_\_\_\_\_ break down slowly and may be more available to aquatic animals.
- A. Persistent (long-lasting) pesticides      D. Persistent (short-lasting) pesticides  
 B. Environmental and economic problem      E. Pesticide remains in the environment  
 C. Persistence                      F. None of the Above

## Introduction to Wetlands Section Topic 8

### Filamentous Algae

1. Unlike microscopic algae, \_\_\_\_\_ are frequently a problem in pond management and are usually visible to the naked eye as a floating mat of thread-like filaments often called "pond moss". They usually begin growth on the pond bottom in shallow water, later float to the surface and may completely cover the pond surface.
- A. Filamentous algae
  - B. Hydrilla
  - C. Water hyacinths
  - D. Parrotfeather
  - E. Eurasian watermilfoil
  - F. None of the Above

### Biological Control

2. Grass carp are not very effective at controlling \_\_\_\_\_, except at very high densities. Grass carp do not control planktonic algae.
- A. Water lettuce
  - B. Hydrilla
  - C. Water hyacinths
  - D. Parrotfeather
  - E. Eurasian watermilfoil
  - F. None of the Above

### Economic Importance

3. \_\_\_\_\_ are a severe environmental and economic problem in all of the gulf coast states and in many other areas of the world with a sub-tropical or tropical climate. This species has rapidly spread throughout inland and coastal freshwater bays, lakes, and marshes in the United States and in other countries.
- A. Water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Alders
  - E. Eurasian watermilfoil
  - F. None of the Above
4. When big floating bladderwort is flowering it is easily distinguished from its native cousins by large spoke-like floats that radiate out from the base of the flower stalk. During the rest of the year, however, it can be confused with \_\_\_\_\_, both of which are rather robust and can appear almost bushy underwater.
- A. Water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Common bladderwort
  - E. Eurasian watermilfoil
  - F. None of the Above

### Control

5. Years of research to find insect biocontrols has resulted in the successful introduction of two insects which are believed to be helpful in keeping water lettuce under maintenance control in many places; however, biocontrol fish which are able to control submersed plants are ineffective against the \_\_\_\_\_.
- A. Floating water lettuce
  - B. Big floating bladderwort
  - C. Water hyacinths
  - D. Algae
  - E. Eurasian watermilfoil
  - F. None of the Above
6. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.
- A. Glyphosate herbicides
  - B. Dithiopyr
  - C. Nonglyphosate herbicides
  - D. Broad spectrum, non-selective herbicides
  - E. Systemic herbicides
  - F. None of the Above

7. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. \_\_\_\_\_ (see the label) will have to be added to the glyphosate solution for good results.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

8. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of \_\_\_\_\_.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Triclopyr
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicide
- F. None of the Above

9. \_\_\_\_\_ benefit other plants growing near them by taking nitrogen out of the air and depositing it in the soil in usable form; fallen alder leaves make very rich compost.

- A. Water lettuce
- B. Big floating bladderwort
- C. Water hyacinths
- D. Alders
- E. Eurasian watermilfoil
- F. None of the Above

10. One danger with any chemical control method is the chance of oxygen depletion after the treatment caused by the decomposition of the dead plant material. \_\_\_\_\_ depletions can kill fish in the pond. If the pond is heavily infested with weeds it may be possible (depending on the herbicide chosen) to treat the pond in sections and let each section decompose for about two weeks before treating another section. Aeration, particularly at night, for several days after treatment may help control the oxygen depletion.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

## Submersed (underwater) Aquatic Weed Section Topic 9

1. Renovate is a liquid triclopyr formulation that is effective on \_\_\_\_\_. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

2. A variety of physical, chemical, and biological control methods have been used in attempts to manage infestations of \_\_\_\_\_. Unfortunately, complete eradication is rare.

- A. Water lettuce
- B. Hydrilla
- C. Water hyacinths
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

3. Navigate and Aqua-Kleen is a granular butoxyethyl ester of 2,4-D and has been effective on Eurasian watermilfoil. \_\_\_\_\_ are systemic herbicides. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. 2,4-D compounds
- F. None of the Above

4. Reward is a liquid diquat formulation that has been effective on Eurasian watermilfoil and is very effective if mixed with a copper compound. It is a contact herbicide. \_\_\_\_\_ act quickly and kill all plants cells that they contact.

- A. Systemic herbicide(s)
- B. Liquid formulation
- C. Liquid diquat formulation
- D. Contact herbicides
- E. Copper
- F. None of the Above

5. Renovate is a \_\_\_\_\_ that is effective on Eurasian watermilfoil. It is a selective broadleaf, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. An aquatically registered surfactant (see the label) will improve the effectiveness of triclopyr.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Copper
- F. None of the Above

6. Aquathol, Aquathol K, and Aquathol Super K are \_\_\_\_\_ and comes in both liquid and granular formulations. These endothall products have been effective on Eurasian watermilfoil and can be mixed with copper compounds for additional effectiveness. Contact herbicides act quickly and kill all plant cells that they contact.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulation
- C. Liquid diquat formulation
- D. Granular butoxyethyl ester of 2,4-D
- E. Dipotassium salts of endothall
- F. None of the Above

7. Sonar and Avast are fluridone compounds, come in both liquid and granular formulations, and have been effective on Eurasian watermilfoil. These are broad spectrum, systemic herbicides. \_\_\_\_\_ are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

- A. Systemic herbicide(s)
- B. Liquid triclopyr formulations
- C. Liquid diquat formulations
- D. Granular butoxyethyl esters of 2,4-D
- E. Copper
- F. None of the Above

8. Any aquatic plant identified as \_\_\_\_\_ should be sent to a specialist for positive identification since hydrilla is such a serious threat to fresh water habitats. It is only through early identification and concentrated control methods that there is any hope of eliminating hydrilla. Fishermen or boaters in waters known to have hydrilla should make every effort not to accidentally transport hydrilla from one lake or pond to another.

- A. Water lettuce
- B. Hydrilla
- C. Egeria, elodea, or hydrilla
- D. Parrotfeather
- E. Eurasian watermilfoil
- F. None of the Above

9. The water hardness also should be considered when using herbicides containing copper. Water hardness--Generally, water hardness is a measure of the \_\_\_\_\_ in the water. In hard waters (above 50 parts per million hardness) it may be necessary to apply greater amounts of herbicide in order to achieve control. In soft waters (below 50 parts per million hardness) some herbicides are more toxic to fish and plants.

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

10. Copper--In soft water some heavy metals, especially \_\_\_\_\_, can be toxic to fish. Some herbicides contain copper and should be used with caution in soft water ponds (less than 50 parts per million water hardness).

- A. Oxygen
- B. Hardness
- C. Nitrogen
- D. Calcium and magnesium
- E. Copper
- F. None of the Above

## Aquatic Herbicides and Controls Section Topic 10

1. \_\_\_\_\_ is used as a defoliant for a wide range of crops and as a herbicide for both terrestrial and aquatic weeds.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Endothall
- E. Systemic herbicide
- F. None of the Above

2. Field and laboratory tests show that \_\_\_\_\_ usually remains in the top inch of soil for long periods of time after it is applied.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

3. Glyphosate itself is an acid, but it is commonly used in salt form, most commonly the isopropylamine salt. It may also be available in \_\_\_\_\_. It is generally distributed as water-soluble concentrates and powders.

- A. Glyphosate herbicides
- B. Acidic or trimethylsulfonium salt forms
- C. Nonglyphosate herbicides
- D. Broad spectrum, non-selective herbicide
- E. Systemic herbicides
- F. None of the Above

4. Some formulations of \_\_\_\_\_ are highly toxic to fish while others are less so. For example, the LC50 ranges between 1.0 and 100 mg/L in cutthroat trout, depending on the formulation used. Channel catfish had less than 10% mortality when exposed to 10 mg/L for 48 hours.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

5. \_\_\_\_\_ can be effective for spot treatment of Eurasian watermilfoil and is relatively selective to Eurasian watermilfoil when used at the labeled rate.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Triclopyr
- E. Systemic herbicide
- F. None of the Above

6. \_\_\_\_\_ can show good control of submersed plants where there is little water movement and an extended time for the treatment. Its use is most applicable to whole-lake or isolated bay treatments where dilution can be minimized. It is not effective for spot treatments of areas less than five acres.

- A. Reward
- B. Fluridone
- C. 2,4-D
- D. A concentrated liquid aquatic herbicide
- E. Diquat
- F. None of the Above

7. Most species of algae can be controlled with very low concentrations of \_\_\_\_\_. It is available in crystalline nuggets the size of rock salt or as a finely ground "snow" grade.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Copper sulfate
- E. Cutrine Plus
- F. None of the Above

8. \_\_\_\_\_, under field conditions, is effective in controlling a broad range of algae including Chara, Spirogyra, Cladophora, Vaucheria, Ulothrix, Microcystis, and Oscillatoria. Effective in hard water.

- A. Glyphosate herbicide
- B. Dithiopyr
- C. Nonglyphosate herbicide
- D. Cutrine Plus
- E. Copper sulfate
- F. None of the Above



9. \_\_\_\_\_ is a concentrated liquid aquatic herbicide effective against a wide variety of submersed, emergent, and floating aquatic plants including duckweed, naiads, and cattails.
- A. Reward
  - B. Fluridone
  - C. 2,4-D
  - D. A concentrated liquid aquatic herbicide
  - E. Diquat
  - F. None of the Above

10. \_\_\_\_\_ poses virtually no environmental risk in aquatic applications because the herbicide concentration rapidly decreases as it is absorbed onto soil, vegetation, and organic matter.
- A. Glyphosate herbicide
  - B. Dithiopyr
  - C. Nonglyphosate herbicide
  - D. Reward
  - E. Systemic herbicide
  - F. None of the Above

## Invasive Plant Rule Section Topic 11

1. Do not contaminate food, dishes, utensils or food preparation areas with \_\_\_\_\_. Any contaminated food should be discarded, and dishes and utensils should be thoroughly washed.

- A. Phenoxy herbicide(s)
- B. Non-selective herbicides
- C. Herbicide(s)
- D. Insecticide
- E. Safe insecticide
- F. None of the Above

2. All herbicides can be classified as either selective or nonselective. \_\_\_\_\_ kill certain weeds with little or no injury to the crop. It is the difference in plant response that determines the effectiveness of the herbicide and safety to the crop.

- A. Phenoxy herbicide(s)
- B. Nonselective herbicide(s)
- C. Herbicide (s)
- D. Selective herbicides
- E. Insecticide(s)
- F. None of the Above

3. \_\_\_\_\_ are those which will kill or injure virtually all kinds of vegetation.

- A. Phenoxy herbicide(s)
- B. Nonselective herbicide(s)
- C. Herbicide(s)
- D. Selective herbicides
- E. Insecticide(s)
- F. None of the Above

4. Volatility refers to the ability of a \_\_\_\_\_ to vaporize and to mix freely with the air.

- A. Phenoxy herbicide(s)
- B. Nonselective herbicide(s)
- C. Herbicide(s)
- D. Selective herbicides
- E. Insecticide(s)
- F. None of the Above

5. \_\_\_\_\_ may produce vapors that can be carried great distances from the target area to other crop sites. Such herbicide volatility can also reduce the rate of application to the target area. A row of grapevines severely injured by herbicides used to clear the nearby railroad.

- A. Herbicide use(s)
- B. Particular pesticide(s)
- C. Greater concentrations of the herbicide(s)
- D. Volatile herbicides
- E. Phenoxy herbicide(s)
- F. None of the Above

6. \_\_\_\_\_ has been most often involved in crop injury by off-target drift. The phenoxy group includes 2,4-D, 2,4,5-T, 2,4-DB, 2,4,5-TP (Silvex) and MCPA. These herbicides are most commonly used for the control of broad-leaved weeds in crops and for the control of undesirable woody species.

- A. Ester(s)
- B. 2,4 D
- C. Insecticide
- D. The phenoxy group of herbicides
- E. Non-selective herbicides
- F. None of the Above

7. Although there is no legal obligation for herbicide applicators to take stock of sensitive crops in the area of application and to consult and cooperate with neighbors in matters of \_\_\_\_\_, it is advisable to do so.

- A. Herbicide use(s)
- B. Particular pesticide(s)
- C. Greater concentrations of the herbicide(s)
- D. Herbicide volatility
- E. Phenoxy herbicide(s)
- F. None of the Above

8. Growers of sensitive crops are not obligated to inform operators of surrounding farms and local industries of the presence and sensitivity of their crops, but it is advisable to seek the cooperation of neighbors in the use of \_\_\_\_\_. Reporting incidents of pesticide damage. Two governmental agencies may exercise regulatory powers in situations of herbicide misuse.

- A. Phenoxy herbicide(s)
- B. Hazardous pesticides
- C. Non-selective herbicides
- D. Greater concentrations of the herbicide(s)
- E. Registration and labeling of a particular pesticide(s)
- F. None of the Above

9. \_\_\_\_\_ are more or less volatile. Vapors can arise from the herbicide while mixing, during and after application.

- A. Triclopyr
- B. Dithiopyr
- C. Nonglyphosate herbicide(s)
- D. Phenoxy herbicides
- E. Dioxin(s)
- F. None of the Above

10. The use of a pesticide in any way contrary to the label is a violation of federal law. Misuse of a \_\_\_\_\_ may make the user liable to either criminal prosecution or to civil proceedings or both.

- A. Phenoxy herbicide
- B. Pesticide
- C. Non-selective herbicide
- D. Greater concentrations of the herbicide
- E. Registration and labeling of a particular pesticide
- F. None of the Above