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Research and Extension

IPM
INTEGRATED PEST MANAGEMENT
& PESTICIDE SAFETY EDUCATION

Stump Treatment Manual

Kansas State University Agricultural Experiment Station
and Cooperative Extension Service

Category 1D

Table of Contents

Directions for Using this Manual

This is a self-teaching manual. At the end of this manual is a list of study questions to check your understanding of the subject matter.

These study questions are representative of the type that are on the certification examination. By studying this manual and answering the study questions, you should be able to gain sufficient knowledge to pass the Kansas Commercial Applicators Certification examination. Correct answers appear on inside back cover.

The Kansas Pesticide Law

The Kansas Pesticide Law (K.S.A. 2-2438a et seq.) regulates the use of pesticide products within the state. Pesticides include herbicides, insecticides, fungicides, rodenticides, and other types of pesticides.

Under this statute, pesticide applicators who use restricted use pesticides are certified; businesses that apply pesticides for hire are licensed; and pesticide dealers are registered. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) (7 U.S.C. 136 et seq.) requires the U.S. Environmental Protection Agency to classify pesticides as either unrestricted use (more commonly known as "general use") or restricted use.

Pesticides classified as restricted use may legally be sold to or used by certified applicators or persons under their direct supervision. Individuals wishing to use restricted use pesticides in the control of cut tree stumps in pastures or other agricultural settings must be certified in either subcategory 1A-Agricultural Plant Pest Control or 1D-Stump Treatment.

Stump treatment means the application of pesticides to the cut stump of any tree or other woody plant to prevent regrowth.The 1D subcategory is limited to the treatment of cut stumps to control resprouting in pastures, rangelands, or lands held in conservation reserve. This category does not allow any other method of tree treatment or any other sites (i.e. right-of-ways). Persons who use other methods of control should become certified in category 1A or another category. To be eligible for certification in this category, 1D, individuals must pass the general exam and the 1D exam.

Pesticide applicators applying a general use or restricted use pesticide commercially must be certified or work under the supervision of a certified applicator and hold a current Pesticide Business License (PBL) or be employed by a business with a valid PBL listing of category 1.

Certified applicators are required to keep certain records of all applications of restricted use pesticides. For commercial applications made on the property of another for compensation, records must be kept for both general use and restricted use pesticides. For each pesticide application made by the certified applicator or someone under the applicator's direct supervision, a written statement of service must be prepared, which includes the following information:

- Business name, street address, city, state of the pesticide business licensee, name and physical address (not a post office box number), name and address of the customer
- Common or scientific name of each pest or pests controlled
- Complete product name of each pesticide applied including:
  - EPA Registration Number
  - Rate of application if a rate is prescribed on the label

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  - Concentration of the active ingredients if the label includes directions regarding concentration
  - Quantity of pesticide mixture actually applied, for example, 20 gallons of tank mix
  - Total area to which the pesticide was applied, Examples: ¼ acre, 35 tree stumps
- Date and location of each and every pesticide application
- Wind direction and velocity
- The signature of the pesticide applicator or supervisor
- Conspicuously state: "Pesticide applied at less than label rate" when a pesticide mixture or solution is applied at a dosage, concentration, or frequency of application that is less than that specified on the pesticide's label or labeling, or inform the customer and obtain the customer's written acceptance before the initial application.

Such records must be maintained for three years from the date of application and shall be open to inspection by employees of the Kansas Department of Agriculture. All applications of pesticides — restricted or general use — must be made in accordance with the directions for use shown on the product's label or by restriction of the category in which the applicator is certified.

It is a violation of the Kansas Pesticide Law to use any pesticide product in a manner that is inconsistent with its labeling.

When selecting a pesticide product to treat cut stumps, the product must be labeled for both cut stumps and the site where it will be applied The label must have cut stump directions for pastures, rangelands or lands in the conservation reserve. Violations may result in the issuance of a civil penalty, or action taken against the pesticide business licenses or applicator's certification, such as suspension or revocation.

Other violations of the Kansas Pesticide Law include:

- Making pesticide applications without a proper pesticide business license or certification
- Making false claims to any member of the public
- Failure to make and maintain required records
- Allowing unlicensed persons to use the licensee's certification or business license
- Sharing of receipts or having a subcontracting arrangement with persons who are not properly licensed
- Using, storing, or disposing of any pesticide material, rinsate or container without regard for public health or environmental damage
- Using false or fraudulent records or reports
- Other violations listed in K.S.A. 2-2454

If a pesticide applicator wishes to contract independently for commercial pesticide application services — that is, if he or she wishes to charge another individual for the application

of a pesticide product to that person's property — the pesticide applicator must first obtain a pesticide business license from the Kansas Department of Agriculture. In order to receive a business license, an application and fees of $140 per category, plus $15 for each uncertified applicator employee, must be submitted. The business owner or an employee must have commercial certification in each category for which the business license is desired. Proof of financial responsibility must be submitted in the form of a surety bond, letter of credit, escrow account or a certificate of liability insurance.

If a surety bond, letter of credit or escrow account is used, the amount of the coverage cannot be less than $6,000 per year. The requirements for liability insurance are that the minimum coverage must be $25,000 for bodily injury for each occurrence, and $5,000 for property damage for each occurrence. Once issued, business licenses expire at the end of each calendar year and must be renewed annually.

It is the responsibility of the commercial applicator to always inform the Kansas Department of Agriculture (KDA) in the event of any change in name, address or other pertinent information related to the applicator's certification. Not informing KDA of this information could result in the applicator not receiving important information on status reports, renewal information, and training opportunities.

The Endangered Species Act

Under the Endangered Species Act (ESA), the Environmental Protection Agency (EPA) has responsibility in protecting endangered and threatened plants and animals (federally listed species) from adverse effects of pesticides.

The U.S. Fish and Wildlife Services (FWS) in the Department of Interior and the National Marine Fisheries Service (NOAA Fisheries Service) in the Department of Commerce, share responsibilities in administration of the ESA and final authority for the interpretation of the Endangered Species Act, particularly for geographic areas where certain pesticides may be used with certain safeguards or are prohibited. FWS manages the terrestrial and freshwater species that would be found in Kansas.

Implementation of the endangered species labeling project will be phased in over several years as pesticides go through registration review. Check out the EPA registration review schedule to learn more at: *http://www.epa.gov/oppsrrd1/registration_review/schedule.htm*

Pesticide labels are beginning to have statements referring applicators to the Endangered Species Protection Program website found at: *http://www.epa.gov/espp/bulletins.htm*

From here applicators can access "Bulletins Live", a website that will

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allow searching individual counties for bulletins pertaining to local federally listed endangered species and local requirements. Bulletins referred to on a pesticide label are "labeling" and are, therefore, legal documents and enforced the same way as the label. Failure to follow endangered species bulletins will be considered pesticide misuse, and enforcement actions will be taken.

An EPA Endangered Species Bulletin includes:

- Map of the county to which it applies
- Description of the species being protected
- Pesticide(s) of concern
- Pesticide use limitations
- Month for which the bulletin is valid

Those who do not have Internet access should call 1-800-447-3813 to request the EPA bulletin for the month needed. This toll-free number is for requesting bulletins only. It should be used *only* if an individual cannot access bulletins via the Internet. It is not an information hotline.

NRCS Contracts and Information

The USDA Natural Resources Conservation Service manages the Environmental Quality Incentives Program (EQIP) by supporting agriculture and environmental quality compatibility goals. Growers may receive assistance, financial and/or technical, to implement land management strategies (structural and/or conservation practices) to achieve their long-term conservation goals.

Each state has a list of priorities that is reviewed by a state technical committee. For information on Kansas NRCS programs, priorities, approved practices, and a list of who serves on the Kansas technical committee visit: *http://www.ks.nrcs.usda.gov/programs/eqip/* and click on Kansas EQIP information. Producers can also contact the local district conservationist for more information regarding this program.

Under these practices, brush management, by mechanically cutting tree stumps and chemically spot treating to clear pastures and other qualifying agricultural land is admissible. The cost-share option is only available at the medium and high infestation levels. Producers can receive financial assistance to accomplish this land management at the higher levels of tree/brush infestations.

In order to stay in compliance with a NRCS contract, a producer must comply with all federal, state and local regulations in regard to the application of pesticides. It is important to read and follow all label instructions. Special attention should be paid to environmental hazards and site-specific criteria listed on the pesticide label.

Biology of Woody Vegetation

The spread of trees and woody plants into pastures, rangeland, and conservation reserve acres has increased the need for cut-stump applications. These trees and woody plants interfere with fence lines and decrease forage production. Cut-stump herbicide applications are used to prevent sprouting and regrowth of this vegetation.

Many trees and shrubs respond to cutting by producing new shoots from dormant buds at or below the ground. Because these shoots, sometimes referred to as stump sprouts, will regrow vigorously using stored energy from the existing root system, simply cutting the main stem often results in a denser stand of the problem woody plants.

In Kansas, most broad-leaved tree and shrub species will resprout vigorously. The most vigorously resprouting trees include locust, hedge, and elm. Many brushy shrubs also resprout strongly, such as honeysuckle, dogwood, and sumac. Eastern redcedar is a species that does not require cut stump treatment. If care is taken to cut the stump low, so no branches with green foliage remain attached, the stump will not resprout.

For this reason, unwanted trees and woody plants should be cut at or near ground level. It is important that the cut be level, smooth, and free of debris, such as sawdust. The stump should then be sprayed with a specific herbicide treatment. Herbicides rely on the downward movement of the active ingredient to the root system through the phloem tissue, a process referred to as translocation. Treatment will be the most effective when the herbicide is applied as soon as possible to the freshly cut stump. Read the label to see if there are use restrictions on the intended herbicide.

In woody stems, the phloem is a thin layer of living cells just inside the bark. Just inside the phloem is a single layer of living cells, the cambium. Xylem makes up the remainder of the stem and these cells are nonliving. In trees, xylem nearest the cambium is light-colored sapwood, and is active in translocation. The darker wood toward the center of the trunk is called heartwood, which is not involved in translocation.

Herbicide applications should be applied to the cambium layer and sapwood of the tree, which is active tissue. The cambium layer is located where the bark and wood meet, usually referred to as the first ring inside the tree. It is important to cover this area of the stump with herbicide to prevent regrowth. Colorants or dyes can be added to the herbicide to help identify treated stumps and ensure adequate coverage. If a colorant or dye is used, be sure it is compatible with the carrier used.

Plant susceptibility to herbicide application depends on a number of factors: time of year; stage of plant growth; soil moisture before, during, and after application; precipitation (rain or snow); and temperatures of soil and air before, at, and immediately after

the application. In general, fall applications are most effective because plants are translocating carbohydrates and proteins to root systems. Cut stump applications will be least effective when the tree has a heavy sap flow, sometimes called bleeding, which is common on mild days during late winter and early spring.

Root grafting is the process by which the roots of separate trees of the same species may grow together, resulting in a vascular connection between the two individuals. Root grafting may result in "flashback," which occurs when an untreated tree near a treated cut stump exhibits herbicide damage symptoms, or dies.

Flashback has been associated with the use of picloram, dicamba, and 2,4-D herbicide. This is of particular concern when chemically thinning a black walnut plantation, or when selecting some trees for removal. Careful applications to the freshly cut stump surface, with minimal runoff or drip onto the soil surface, can reduce the risk of flashback. Flashback also can occur between species growing in close proximity to treated stumps. As the treated root system dies, it releases herbicide into the soil, which may be picked up by adjacent vegetation.

Herbicide Treatments

Applicators should read the label to see what species will be controlled with each chemical. The label should include instructions on how to use the product. For example, if it is mixed with diesel fuel, it will note the mix rate. *The label is the legal authority. Products must be used according to the label.* Labels *do* change, so applicators should read the label on each new container of chemical.

Not all herbicides labeled for cut surface treatments are labeled for use in cropland or are to be used where livestock graze. Pasture and rangeland are considered to be cropland, so herbicides such as Tordon RTU should not be used in these areas. Non-cropland areas may include fencerows, roadsides, and right-of-ways. Applicators using products on non-cropland areas need to be certified in additional categories. Consult the label for hay or grazing restrictions for specific livestock species.

Some products must be mixed with diesel fuel, while other products can be used directly from the container. Pay attention to this difference.

Even though herbicides used in cut-stump applications have low toxicity to animals and humans and do not readily leach or runoff from the treated site, applicators should still use the products according to the label. Drift or runoff may be hazardous to non-target aquatic and terrestrial plants. It is important not to contaminate water when cleaning equipment or disposing of equipment rinse water. Consult the label for further environmental hazards.

The following table lists different labeled products. This is not a list of all available products, but represents the most common choices. This table is helpful but the *label* is the authority.

Table 1. Stump application in range and pastureland

Product	Active Ingredient	Mix	Comments
Remedy Ultra	Triclopyr	25% in diesel fuel	Mix 1.0 qt chemical in 3.0 qt diesel
PastureGard	Triclopyr and Fluroxypyr	50% in diesel fuel	Mix equal amounts of chemical and diesel fuel
Crossbow	Triclopyr and 2,4-D	4% chemical in diesel fuel	
Pathfinder II	Triclopyr	Ready to use out of container. No mixing required.	
Arsenal	Imazapyr	10% in water	

Application Tips
Keep these points in mind when applying herbicides:

- Always follow directions on herbicide label.
- Before spraying, brush any sawdust or debris off cut surface.
- Apply to freshly cut stump.
- If stump has been cut for more than 30 minutes, and for hard-to-control species, spray cut stump as well as bark from cut stump to ground level.
- If roots are exposed on surface, spray them also.
- Critical area to be sprayed is the sapwood (cambium layer) just inside the bark.
- Apply enough liquid that it pools on cut surface.

Application Equipment for Cut Stumps

Equipment for applying herbicides to cut stumps usually consists of a pressurized hand applicator, small backpack sprayer, a sprayer mounted on a four-wheel all-terrain vehicle (ATV) with handheld gun, hydraulic tree shears or saws, or a simple paint brush. The application equipment needed depends on the size of area that needs to be treated as well as the type of herbicide used. Low pressures are adequate for this type of application. For applications with a handheld spray gun, a common adjustable cone nozzle is recommended. It is not necessary to use fan-shaped patterns. If chemicals used are soil active or a drift concern is present, use caution to prevent off-site movement.

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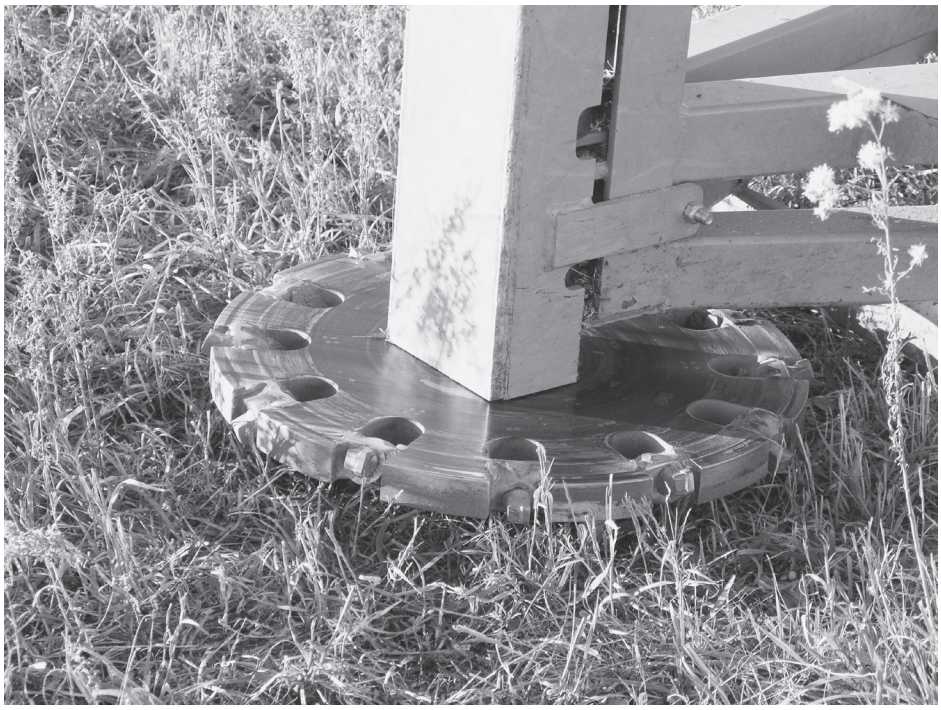
Application Equipment for Cut Stumps

Photos



Hydraulic tree saws, like this one, may be used in cut stump applications.

Using a hydraulic saw to cut down a tree in a pasture. Trees should be cut close to the soil surface.

Photos

Position the spray nozzle directly over the cut stump, but high enough to ensure that the stump is in the spray pattern. Stump is being treated immediately after cutting.

The entire cut surface was sprayed to prevent resprouting.

Safety Considerations

Sprayer Size	2% Solution
1 gallon	16 tsp
3 gallons	8 fl oz
5 gallons	12.8 fl oz
10 gallons	25.6 fl oz
14 gallons	36 fl oz
25 gallons	4 pints
100 gallons	8 quarts

(continued from page 9)

Trees or woody vegetation should be cut close to the soil surface before application. Before spraying, brush off any soil or sawdust. Spray the stump immediately after cutting. If a delay occurs in spraying, it may be necessary to use an oil-based product or freshen the stump surface by cutting or chopping to expose fresh tissue. Do not spray when basal stems are wet.

Adjust the spray nozzle so it delivers a medium- to coarse-sized spray droplet in a solid cone-shaped pattern. Hold the spray wand so the nozzle is within 1 or 2 inches of the stump, and spray the exposed cambium layer and root collar (exposed bark on the side of the stump) around the circumference of the stump until it is wet while avoiding excess herbicide runoff.

It is especially important for the herbicide to cover the bark, crown buds, and all exposed roots to prevent resprouting. Spraying the entire cut surface is also an option. Using a spray-marking dye can help in keeping track of the stumps that have been sprayed. A surfactant designed to aid in absorption of the chemical may also be added to the spray mixture.

If using a spray system attached to hydraulic shears or saws, position the spray nozzle directly over the cut stump high enough to ensure that the entire stump is within the spray pattern. The use of a full or solid cone nozzle with an orifice providing medium to coarse droplets is suggested. Using dye as an indicator, spray the entire cut surface of the stump almost to the point of runoff.

Mixing
Many labels include spot application rates and recommendations for use in hand sprayers. In other cases, applicators must calculate correct mixtures. See table on the left for examples.

Safety Considerations

Personal Protective Equipment
The purpose of personal protective equipment is to provide protection from identified hazards. Personal protective equipment for cut-stump applications can include goggles, hard hat, long-sleeved shirt, hearing protection and chemical resistant gloves. It is important to consult the product label to see what type of equipment is required. Wear proper protective clothing and have a first-aid kit available in case of emergencies.

Common Dangers
Use extreme caution when cutting trees close to power lines because it is possible to be electrocuted. Always be aware of your surroundings to help prevent injury from a falling tree. Talk with coworkers to make sure you know where they are at all times. Follow a two-tree rule when felling. No one, other than the person cutting, should be within two tree lengths of the tree being felled. It is important to follow the steps outlined in the instruction manual for operation and maintenance of equipment. Know the limitations of the machine you are using.

Environmental Hazards

Heat Stress
You can become seriously ill or die if you do not take the proper precautions while working in high temperatures and humidity. Heat can reduce physical performance, as well as mental alertness, causing more accidents.

Heat Facts

- You are more likely to suffer from a heat related illness on humid days.
- If you are not used to working in the heat, you are more likely to suffer from a heat- related illness. It can take your body from five days to two weeks to be acclimated to working in the heat. It is recommended that new workers, who begin in hot, humid weather, start out by working half of the normal time and workload on the first day, and then build up to a complete day by the end of the week.
- You are more vulnerable to heat illness if you have suffered from it in the past.
- During the course of the day, you can produce as much as two to three gallons of sweat. Replenish this fluid by drinking liquids so you do not suffer from a heat-related illness.

Sun Exposure
Prolonged exposure to sunlight causes skin cancer, cataracts, and other serious illnesses.

- Choose a sunscreen that is marked broad-spectrum. This protects you from both UVA and UVB rays. Ensure the sun protection factor (SPF) is at least 15.
- Wear a hat or sun visor, sunglasses, and lightweight long-sleeve shirts and pants on sunny days to help control body temperature and block the sun.

Help Yourself
Safe work habits are important. Here are three important actions you can take to be safe on the job site.

1. **Learn All You Can.**
   To prevent tree-cutting accidents, read and follow directions that come with cutting and trimming equipment. While reading, pay attention to safety instructions and look for warning labels on the equipment. If you have questions, stop and ask your supervisor before you continue.
2. **Concentrate on Working Safely.**
   Sometimes you may be tempted to take risky shortcuts. Remember that an accident can leave you permanently injured or cut your life short. For your safety and the safety of those around you, do not take unnecessary risks. No deadline is so pressing you can't take the time to do your work safely.
3. **Additional Precautions**
   Do not operate machinery if you are tired or have taken drugs or alcohol. If you are on medication, discuss with your doctor or pharmacist if you are capable of operating machinery safely.

Stump Treatment Study Questions

These study questions are to help you in learning the material presented in this manual.

1. *The stump treatment category (1D) allows the treatment of stumps in what type of sites?*
   a. pastures
   b. right-of-ways
   c. CRP
   d. both a and c
2. *How long must an applicator maintain application records?*
   a. one year
   b. three years
   c. don't need to be kept
   d. five years
3. *An example of a brushy shrub that resprouts is:*
   a. elm
   b. dogwood
   c. sumac
   d. both b and c
4. *A tree species that does not require treatment to the cut stump is:*
   a. hedge
   b. ash
   c. eastern redcedar
   d. locust
5. *What process is responsible for the downward movement of the herbicide?*
   a. translocation
   b. flashback
   c. adsorption
   d. transpiration
6. *Factors to consider when selecting a herbicide include:*
   a. is the chemical labeled for use on cut stumps
   b. the species controlled
   c. is the chemical labeled for the site
   d. all of the above
7. *What area of the stump needs to be covered with herbicide?*
   a. xylem
   b. heartwood
   c. cambium layer
   d. none of the above
8. *What herbicide is subject to "flashback"?*
   a. picloram
   b. dicamba
   c. triclopyr
   d. both a and b
9. _____ *is a product that requires no mixing?*
   a. Crossbow
   b. Remedy Ultra
   c. Pathfinder II
   d. Arsenal
10. *Common application equipment for cut stump applications include:*
    a. backpack sprayers
    b. hydraulic shears and saws
    c. hand applicator
    d. all of the above
11. _____ *is a product that is strictly labeled for use in non-cropland.*
    a. Tordon RTU
    b. PastureGard
    c. Remedy Ultra
    d. Arsenal

12. What is the best way to determine rates, directions, and precautions of a pesticide product?

a. consult an operator's manual

b. talk to a neighbor

c. read the label

d. speak with the manufacturer

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Answers

1. d 2. b 3. d 4. c 5. a 6. d 7. c 8. d 9. c 10. d 11. a 12. c

References

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