SELECTIVE HERBICIDE APPLICATIONS FOR LOW IMPACT VEGETATION MANAGEMENT OF EXOTIC SPECIES AND ENHANCEMENT OF NATIVE PLANT COMMUNITIES

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Selective and specific management for the control of exotic (non-native) plants is necessary for preservation of native plant communities. Managers of federal, state, or county land holdings and parks, wildlife areas, recreation areas, and historic sites are frequently charged with selectively managing the enhancement of desirable or native plant communities. In addition to exotic plant control programs, selective management may include vegetation control on fence rows, road rights-of-way, boundary line corridors, trails, and understory brush control for aesthetics.

Most invasive exotic plants are opportunistic and tend to establish more frequently on sites that have had some form of soil disturbance. They are typically very fast growing, and therefore, are able to outcompete the native, slower growing vegetation. Mechanical removal of exotics causes soil disturbance, which creates a favorable environment for re-invasion (usually seed germination) of the same exotic weeds and/or additional exotic plant problems.

Selective removal of the undesirable exotics usually acts as a "release treatment" for native desirable plants by allowing sufficient light, moisture, and nutrients for survival and maximum growth. Response by native plants is very rapid, and in many situations, eliminates the need for planting or moving native species onto a site. Leaving native plants, sedges, and grasses undisturbed reduces soil erosion and provides unfavorable conditions for reinvasion of exotics.

Herbicide treatments applied properly cause minimal soil disturbance, thus creating a favorable environment for expansion and development of native plants, as well as an unfavorable environment for re-invasion of exotics. Also, leaving the native plants, sedges, and grasses undisturbed, increases their ability to compete, and the potential for rapid expansion and occupation of the area.

The knowledgeable manager chooses methods and herbicide treatments that are environmentally compatible, effective, and economical. A proper understanding of herbicide labeling, uses, and precautions, is of utmost importance for a successful program. Potential for damage to untreated, desirable plants must be understood, particularly where soil active herbicides are used. Improper use of soil active herbicides near or within the root zone of sensitive plants can cause injury or death to desirable plants.

HERBICIDES, APPLICATION METHODS AND RECOMMENDED PROCEDURES

Directed Basal Bark Treatments

Basal bark applications are effective for selective control of saplings less than two inches basal diameter and other sensitive species. Basal applications offer the advantage of a low profile application, selective control of target plants only, and can be applied with hand backpack equipment. Selected stems are removed while desirable plants are left to naturally and rapidly occupy sites. When properly applied, complete control of foliage, stems, and roots is possible.

Applications can be made year-round, but are most efficient when easy access to the base of undesirable stems is possible. During hot weather (above 90 degrees), some volatilization is possible, especially with diesel mixtures and may cause injury to non-target sensitive species that are in close proximity to target plants.

Basal treatments can be used in combination with cut surface treatments when large undesirable trees are mixed with smaller stems. Freshly cut stumps should be treated with water soluble amine herbicide formulations labeled for this use; previously cut stumps (up to several months old) may be treated with low volume basal herbicide mixtures.

An effective basal mixture contains Garlon 4 (an oil soluble formulation) in an oil diluent. Oil carriers such as JLB Oil Plus, JLB Oil Plus Improved, Arborchem Basal Oil, CWC Basal Diluent, Hygrade oil, Penevator or generic mineral or vegetable oil, have been found to be very effective diluents. These products are also generally less offensive to the applicator and environment than diesel or kerosene. Always check the product label for specific rates, uses, directions, precautions, hazards, etc.

Low Volume Basal

Basal treatments can be applied to a range of stem sizes up to very large trees, however, as bark thickness increases, more herbicide is needed and efficacy is sometimes reduced. The lower 12 to 24 inches of target stems should be sprayed wet with the spray mixture, and applications should be made in a manner to completely encircle the stem or trunk but not to the point of run off. In situations where complete control of undesirable woody plants is required, good coverage of the bark is necessary. Low volume basal treatments are generally very effective, with little need for follow-up treatments, however, this method can become costly in stands containing large numbers of undesirable trees. Low volume basal treatments are typically mixed at 15 to 30 percent herbicide concentrate in oil and is applied at relatively low volumes to basal portions of target stems as described above. The higher percentages of Garlon 4 are typically used for larger diameter, thick bark, and difficult to kill species.

Basal applications with Garlon 4 mixtures control a wide range of woody plants and are particularly effective against Brazilian Pepper and Australian Pine. When properly applied, complete control of foliage, stems, and roots is possible. Generally concentrations of 4 – 10% are effective on sensitive species such as small Brazilian peppers and Australian pines less than 8 inches in diamater. Large Brazilian peppers (up to several feet in basal diameter) and Australian pines (up to about 20 inches

in basal diameter), can be effectively controlled with basal treatments; however, they require thorough coverage of the lower stem with the recommended mix ratios (15% to 30% Garlon 4 in oil) or retreatment may be required.

In areas of dense infestations, retreatments may be required due to missed stems, new seedlings, and root suckers. Usually, one or two follow-up spot treatments at nine months to one year intervals will provide complete removal. Large plants that are not completely killed should be retreated. Retreatment should be made to the parts of living stem(s) and resprouted stems.

Melaleuca trees with a diameter less than one inch should be treated with a basal bark application of Garlon 4, as discussed above; malaleuca trees greater than one inch in basal diameter have formed bark that is too thick for penetration with basal mixtures and effectiveness drops off sharply.

Streamline Basal

This is the fastest and most economical basal bark application method for controlling woody plants; sometimes less control can be expected for larger trees when compared to low volume treatments. It is especially appropriate on areas with stump resprouts and multiple stems. Best results are achieved on young, vigorously growing juvenile stems two to three inches or less in basal diameter.

When treating multiple (clump) stems, less than about 1.5 inches in diameter at breast height (DBH), apply the mixture to one side of the stem(s) in a back-and-forth swinging motion about 10 to 24 inches above the base of the plant. For single stems, apply to the bark with an up and down motion, hence, placing more of the herbicide mixture on the stem. For stems 1.5 to 3 inches DBH, the herbicide should be applied completely around the tree in an initial band of two to three inches; within about an hour after application, the herbicide should spread down the stem six inches or more. For stems greater than three inches DBH, the herbicide should be applied completely around the tree in an initial band of six to eight inches; within an hour after application, the herbicide should spread 10 inches or more down the stem.

Melaleuca trees with a diameter less than one inch may be treated with a basal bark application. As discussed above, melaleuca trees greater than one inch in basal diameter have formed bark that is too thick for penetration with basal mixtures and effectiveness drops off sharply. For streamline basal applications, Garlon 4 is usually mixed at rates of 12 to 20% in mineral or vegetable oil. The percentage of Garlon 4 is sometimes increased or more of the mixture is applied for large, difficult-to-kill species.

Recommended Equipment and Configurations

The Solo Model 475 with diaphram pump or Swissmex SPI are examples of effective and commonly used backpack sprayers. For low volume basal applications, the spray tip should be a narrow angle (15–25 degrees) flat fan tip nozzle such as a TP 1502 or TP 1503 or TP 2502/TP2503; a solid cone nozzle; or an adjustable conejet such as a Tee-Jet 5500-X8 or equivalent. Any of these tips may be installed in the spray wand that comes with the spray unit. A better alternative is a brass tip shut off wand such as the Model 31 with tip shut off or a Spraying Systems Model 30 Gunjet, available from Chemical Containers, 813/638-1407 or other equipment suppliers.

For Streamline applications the backpack sprayer is usually equipped with a Spraying Systems Model 30 Gunjet and a TP-0001 tip or DE-1 disc. Experienced applicators often use a TP-0002 or DE-2 disc; however, less experienced applicators often waste much of the spray mixture with these tips. The DE discs cost about one-third as much as the TP tips, and they produce a better straight stream spray pattern. The Gunjet may be attached to most backpack spray units that produce pressures between 20 to 50 psi. All backpack sprayers and spray guns should have chemical resistant seals for the herbicides and carriers being used. These are also available from Chemical Containers, 813/638-1407 or other equipment suppliers.

Brewer International, Vero Beach, FL, markets a low volume oil carrier as JLB oil plus containing mineral oil and Limonene, or JLB oil plus improved containing vegetable oil and Limonene. CWC Chemicals, Inc., and others, market a low-volume basal mineral oil for basal applications. For streamline or low volume applications using CWC or other mineral oils that do not contain an adjuvant, an oil soluble adjuvant should be added at about 5%.

Ready-to-Apply Basal Products

Chopper is a ready-to-apply basal product. The application and equipment is as described for streamline basal. With Chopper, the visual effects may not occur until months after application. Provides limited to no control of blackberry, dewberry, locust, redbud, hollies, winged elm, hawthorn, and magnolia. This product is soil active and can cause damage to desirable plants in close proximity to treated stems. This product is used mostly in forestry and to a lesser extent in right-of-way vegetation management.

Directed Foliar Spray Applications

Power driven ground equipment and backpack sprayers can be effectively used for exotic plant treatments to control undesirable woody plants. Power driven ground equipment is commonly used to spray large/tall plants or large areas. Properly adjusted equipment should deliver a uniform spray with nozzle pressures of about 30 to 80 psi and should generate large spray droplets to reduce potential for spray drift. Higher spray pressures produce many small spray particles, which may drift onto sensitive desirable plants adjacent to the treated area.

Application is made by directing the spray on the target foliage, being sure to spray the growing tips and terminal leader. Techniques must be employed to prevent the spray from contacting foliage of desirable plants—DO NOT spray the desirables, it may kill or injure them.

Commonly used power equipment consists of portable power driven spray units mounted on a truck or all terrain vehicle. A wide variety of pumps, tanks, and accessories are used. The most common and maintenance-free pump is a diaphragm pump driven by a gasoline engine, or a self-contained 12 volt pump unit. Routinely used spray guns are Spraying Systems Model 2 and 2A Gunjets. These are adjustable spray guns which produce patterns ranging from a solid stream to a wide cone spray. These spray guns may produce small spray particles at the cone spray setting, resulting in spray drift. Chemical Containers, Inc. (813/638-1407) assembles a dual spray Gunjet that accommodates two flat spray tips with different volumes and patterns. The spray gun can immediately be switched from one spray tip to the other by rotating the spray head. The two most commonly used spray tips for

the spray gun are TP 0512, TP 4010, or TP 4020. These tips produce few fine spray particles so spray drift potential is reduced.

Backpack spray applications are used primarily for selective applications to control widely spaced plants less than six feet tall. Target plants are usually sprayed until the crown is wet, but not to the point of run-off. Application is made by directing the spray on the target foliage, being sure to spray the growing tips and terminal leader. Techniques must be employed to prevent the spray from contacting foliage of desirable plants—DO NOT spray the desirables, it may kill or injure them.

The Solo Model 475 backpack with diaphragm pump or Swissmex SPI are examples of effective and commonly used backpack sprayers. A spray tip such as a TP 2503 or TP 2504 that produces large spray droplets very effectively reduces spray drift and potential for damage to the desirable species. The 2503 spray tips may be installed in the spray wand that comes with the spray unit, or a Model 30 Gunjet with the 2503 or 2504 spray tip may be attached to either of the backpack spray units. If an adjustable tip is used, a Tee-Jet 5500-X8 or equivalent is recommended (these produce more fine spray droplets). All backpack sprayers and spray guns should have chemical resistant seals for the herbicides being used.

Commonly used herbicides for foliar applications are Garlon 3A, Garlon 4, Arsenal AC, and Roundup or Accord. Always check the product label for specific rates, uses, directions, precautions, hazards, plant sensitivity, etc.

Cut Surface Treatments

Tree injection, frill or girdle, and cut-stump treatments are the commonly used cut-surface treatments for exotic species. These methods are generally used to eliminate larger undesirable species. One advantage of cut-surface treatments is that very little equipment is required for application and therefore, is very economical. Also, cut-surface treatments in combination with basal or directed foliar applications are very effective management strategies where both large and small undesirable stems are selected for removal. Most cut surface treatments can be applied at any time of the year.

Herbicides commonly used for cut-surface treatment in exotic plant control programs are Garlon 3A, Arsenal, and Velpar L. Garlon 3A undiluted, or diluted in a 1:1 ratio with water for injection (hack 'n' squirt) or cut stump is very effective for controlling Brazilian pepper and Australian pine. Velpar L diluted in a 1:1 ratio with water is effective for controlling Brazilian pepper and Melaleuca trees. Arsenal AC diluted in a 1:1 ratio with water is particularly effective for controlling Melaleuca trees. Arsenal and Velpar L have soil activity, so caution should be exercised when applied near desirable plants or trees. Always check the product label for labeled uses, directions, precautions, certain hazards, etc.

A dye is often added to the herbicide or herbicide mix to aid in treatment monitoring, especially when the applications are done on a contractual basis. When dyes are used, application equipment usually requires more maintenance, especially regular cleaning.

Tree Injection Method (Hack 'n' Squirt)

Tree injection can be made with tools designed specifically for making the cut in the tree and simultaneously applying the herbicide to the opening, such as the Jim-Gem injector. A simpler but equally effective method is to use a hatchet to make the cut and a squirt bottle to apply the herbicide to the opening. In any case, the wounds should angle downward through the bark into the sapwood - waist high for hatchet and injectors at the base of the tree. Space single cuts evenly around the tree trunk with the spacing between the cuts as recommended by the product label. When a hatchet and squirt bottle are used, apply the herbicide to the cut when the hatchet is removed. The squirt bottle should have chemically resistant seals and produce about 1 ml for each pull of the application handle.

Frill or Girdle Method

This method usually involves cutting completely around the tree into the sapwood with an ax or hatchet. Completely wet the cuts with the herbicide using a squirt bottle, or a small pressurized spray unit. When making tree injection or frill applications, additional cuts and/or increased herbicide rates are usually required for trees 10 inches in diameter and larger or damaged trees.

Cut Stump Treatment

Freshly cut stumps should be treated as soon after cutting as possible; within minutes is usually the most effective. A delay of more than two hours between cutting and herbicide treatment can reduce the effectiveness of the herbicide. A pressurized backpack sprayer or spray bottle is very effective for this application. The cambial area and sapwood (about the outer 1-inch of the stump) must be thoroughly sprayed with the herbicide. Smooth, level stumps, free of bark tears, sawdust, or other debris, can be most easily and effectively treated. Stumps that have been cut previously up to about 8 months, may be treated effectively with the previously described basal bark spray mixture. The outer edges of the stump should be sprayed, until the spray runs down the sides of the stump. If the stumps are high above the ground, the application may be made as a basal bark treatment.

Selective Kudzu Control With Herbicide Transline

Kudzu is a most prolific vine frequently growing a foot each day. It climbs to the top of shrubs, trees, buildings, and electric poles, damaging or killing most other plants within its path. It is a difficult plant to control since it spreads by both seeds, root sprouts, and vines. Mechanical trimming and cutting is not effective because the large tuberous root system has a tremendous capacity to resprout after cutting. In the Southeast, managers of recreation areas, parks, campgrounds, historic sites, vistas, fence rows, roadsides, right-of-ways (pole/guy wire treatments), forests, wildlife openings, etc., usually have a need to control kudzu, but would prefer to accomplish this without affecting the desirable vegetation. Transline herbicide is a new product that provides selective kudzu control. Transline has a narrow control spectrum primarily affecting legumes, thistles, and other composite weeds; usually causing little or no permanent damage to other plant species, even when sprayed on their foliage. On some heavily sprayed, non-legume broadleaf tree species, minor leaf curling or other leaf tip damage may occur. If so, recovery is usually within a few weeks. Since Kudzu is a legume—**TRANSLINE KILLS IT.**

Management Options

Kudzu eradication programs require a commitment to annual spraying and usually take a minimum of three growing seasons to accomplish. The age of the Kudzu patch determines the level of difficulty in accomplishing the eradication. Usually, the first spray application is followed with spot spraying on the remaining plants each year for a period of about three years. Older Kudzu patches may require longer follow-up periods. Burning a Kudzu patch during the winter prior to a summer treatment makes it easier to spray a site and usually reduces the amount of vines in trees.

Kudzu spray treatments should be applied beginning in late June and can be applied until late September or October, as long as the plants are actively growing and not under drought stress. Application during active vegetative growth and just prior to or during flowering is the best time to apply. A frequently recommended mix is 32 fluid ounces of Transline in 100 gallons of water, and 1/2 to 3/4 percent of a good non-ionic surfactant should be added to improve wetting and penetration. When spraying, do not exceed the maximum label rate of 21 fuild ounces of Transline per acre. Where some damage to neighboring trees or other woody plants can be tolerated (or is desired), the addition of Garlon 4 Herbicide at 1 to 2 quarts per 100 gallons as a tank mix with Transline can improve the long-term control of kudzu. This is especially desirable in old, established kudzu patches.

Transline spray mixtures should be applied to all or at least the majority of the kudzu foliage - wetting the foliage to the point of run-off. Sometimes Kkdzu may have grown so high in a tree or on a power pole that the spray will not reach the taller leaves. In these situations be sure to completely spray all of the lower leaf surfaces to run-off. Caution should be exercised around high voltage power lines.

Kudzu treatments with Transline can be expected to provide season-long control in almost all cases and some residual control for the first half of the next season following the treatment. Newly established kudzu patches (1-3 yrs) are easier to control, older patches (4–9 yrs) are more difficult, and 10- to 15-yr-old patches are the most difficult to control. Broadcast treatments are usually required for one or sometimes two years with spot mop-up treatments in the third and possibly subsequent treatment seasons. Usually, mop-up treatments on larger patches in the second or third growing seasons after the initial treatment can be treated with a backpack sprayer. Also, small kudzu patches, fence rows, poles and guy-wires, right-of-way encroachments, etc., usually less than one acre, can be treated with a backpack sprayer.

Powered spray equipment should be capable of high volume spray coverage, spraying the foliage to the point of run-off. Generally, the equipment used for high volume foliage treatments consists of a handgun, hose and reel, and a truck or trailer mounted spray tank and powered spray pump. A wide variety of pumps, tanks, and accessories are used. The most common and maintenance-free pump is a diaphragm pump driven by a gasoline engine, or a self-contained 12-volt pump unit. Routinely used spray guns are Spraying Systems Model 2 and 2A Gunjets. These are adjustable spray guns which produce patterns ranging from a solid stream to a wide cone spray. These spray guns may produce small spray particles at the cone spray setting, resulting in a spray drift. Caution should be taken to avoid or minimize fine spray particles by lowering pressure to the optimum setting for the spray tip being used. Chemical Containers and other suppliers market a Spraying

Systems Model 30 Gunjet with a roll-over spray valve. This valve allows two spray tips to be mounted on the spray gun, with immediate switching from one spray tip to the other. Examples of commonly used spray tips in this system are Teejet 0512 and 4020 tips. These are flat spray tips that minimuze fine spray particles. Power driven ground equipment that is properly adjusted should deliver a uniform spray with nozzle pressures of about 45 to 80 psi and should generate large spray droplets to reduce potential for spray drift. Higher spray pressures produce many small spray particles, which may drift onto adjacent property.

The Solo Model 475 with diaphragm pump or Swissmex SPI are examples of effective and commonly used backpack sprayers. A spray tip such as a TP 2503 that produces large spray droplets very effectively reduces spray drift and potential for drift. The spray wand that comes with the spray unit may be used, however, a better alternative is a brass tip shut-off wand such as the Model 31 with tip shut-off (available from Chemical Containers) or a Spraying System Model 30 Gunjet. A narrow angle (15-25 degrees) flat fan tip such as TP 1503 or TP 2503 is often used with these wands and guns. If an adjustable tip is used, a TeeJet 5500-X8 or equivalent is recommended. All backpack sprayers and spray guns should have chemical resistant seals for the herbicides being used.