To Control or Not to Control Creosotebush—That is the Question

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The Yellow flower and fuzzy globe-shaped fruit of the creosotebush, shown magnified here about five times. The flowers bloom and are rapidly followed by development of the fruit, which often gives the bushes the appearance of being covered with a light frosting of snow. Flowering may occur anytime from late winter through summer, and is dependent upon geographic location and rainfall pattern.

Creosotebush may be a stranger in much of the nation's farming regions, but it's well known in the Southwest. An estimated 35 to 46 million acres are infested with this plant in the southwestern United States and northern Mexico. Known locally as greasewood, gobernadora, and hediondilla, it it found in pure stands and associated with bursage, cactus, and other plants. It's scientific name is *Larrea tridentata* (D.C.) Coville.

Reaching 12 feet or taller on good soil with ample rainfall, creosotebush grows 4 to 5 feet tall in most of its areas of distribution. In such places as the Avra Valley of southern Arizona the plants are clumped together to form mounds, but the usual growth pattern is evenly spaced single plants. The lower the rainfall, the wider the plants are spaced. Creosotebush is found at elevations varying from below sea level in Death Valley and Imperial Valley, California, to about 8,600 feet near Zacatecas, Mexico. Rainfall of this region varies from 3 to 16 inches annually.

The plant gets the name creosotebush from a reddish brown resin that covers the plant and which has a creosote-like odor. This resin is thought to filter out the sun's rays that might be harmful to leaves and helps prevent the plant's drying out in arid regions. The resin makes the plant unpalatable to livestock and wild animals, rendering it useless for forage.

Following spring or summer rains, creosotebush plants exhibit a shiny laurel green color and produce a cover of bright yellow flowers. These flowers soon develop into fuzzy white seed balls.

What About Value of Control?

Chemical control of creosotebush is not economically feasible in many cases because of the high herbicidal rates required and the low potential productivity of the sites. Often it is found where there is too little moisture or soils are unsuitable for grasses and other forages. Such infestations would probably cost more to control than the area's productivity could justify.

In its more eastern zone of infestation particularly, this weed continues to invade vast acreages of productive desert grassland. The result is a marked reduction of grazing capacity. Additionally, the plant has relatively little soil protective value as compared to that of the grasses which it replaces. Marked soil erosion has often been observed following complete replacement of a grassland by creosotebush.

Where creosotebush has invaded productive grazing lands, an effective control program probably could profitably restore these lands to productive use. Complete restoration may not be possible on areas where invasion has severely depleted the soil of its ability to grow forage.

Chemical Control Evaluated

The expense of high rates of herbicide necessary for control makes such treatment prohibitive on soils of low productivity. As an example of rates required, foliar spraying with 4 lb/A of 2,4-D or 2,4,5-T esters killed only 28% of creosotebush plants in a study conducted in Arizona.

Tordon (picloram) was considerably more effective. One-pound per acre

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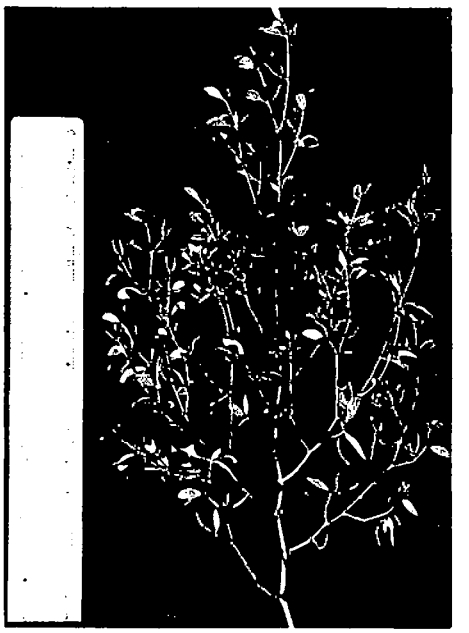

Typical foliage of the creosotebush. The leaves are thick and leathery, and covered with a resin which apparently makes them unpalatable to grazing animals.

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toe. Others have a single host such as the species that attacks only incense cedar. One form of dwarfmistletoe attacks red fir but not white fir, and another white but not red fir. Such characteristics are important in designing control programs.

Control measures

There are several possible approaches for control in forests. Dwarfmistletoe is easier to control than the green, since new infections usually occur within a few feet of infected trees. Green mistletoe can be widely scattered by bird distribution of seed.

Clear cutting and replanting is a solution for heavy infestations of dwarfmistletoes. Logging of infected trees minimizes the problem in scattered infestations. In some instances, planting resistant species following clear cutting is a solution.

With green mistletoes, such as the one attacking white fir in France, infected trees are logged. Then the interval between loggings is shortened for quick cutting of new infestations.

The main control in orchards and parks is pruning of affected branches or cutting out infections on large stems or trunks. To be really effective, all mistletoes in an orchard, park, or city should be removed to reduce the supply of seed. This makes it possible to easily maintain an acceptable level of mistletoe infection, unless there are heavy infestations of green mistletoes nearby. Where this situation exists, it may be desirable to extend control beyond the area of main concern.

Chemical control of mistletoes is still in early stages of development. Greatest success has been on eucalyptus in Australia, using a form of 2,4-D (the triethanolamine salt) in holes or narrow ax cuts in the trunk. Ten ml of 10% 2,4-D applied to several holes or cuts around the stem is enough for a tree 9 inches in diameter.

Effect of 2,4-D is influenced by season, stem diameter, and species. Control during drought has been poor. More recently, salts of 2,4-DB and MCPB have killed mistletoe with less host injury than with 2,4-D, which can be expected to kill 5% of the hosts.

Green mistletoe on California walnut trees has been controlled fairly well by spraying when the trees are dormant. A spray of 1%, 2,4-D (isopropyl ester), amitrol, or atrazine in 6% oil emulsion killed 50 to 60% of the parasites based on observations 3 or 4 years after spraying. Some control of dwarfmistletoes has been obtained by direct spraying of infections with 2,4,5-T in oil diluent. This would be used only in situations that could justify special methods.

By use of radioactive tracers, it was found that chemicals applied to cuts in stems of trees moved into both the green and dwarf types. Direct application to the mistletoes was much less certain of getting the chemical into the parasite's food system. The problem appeared greater with the dwarf than with the green. Results indicate the trunk injection methods, as done in Australia, hold the most promise.

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rates killed 95% of plants and 0.25 lb/A gave 50% control. Various other chemicals tried as soil treatments were not effective at economical rates.

In recent Arizona research, attempts were made to replace the useless creosotebush and burroweed with fourwing saltbush, a valuable browse plant. The creosotebush and burroweed were sprayed with 2 and 3 lb/A Tordon, respectively. Two years later at least 90% of the burroweed was dead, but only 10% of the creosotebush had been killed. The low percentage of creosotebush plants killed contrasts rather markedly with the results of the previous study. These differences suggest that the effectiveness of the herbicide may be influenced by region, year of spray treatment, exact season of spraying, or other unknown factors.

The most recent research report from New Mexico indicates that an 88% control of creosotebush may be obtained following application of 2.0 lb/A of Banvel (dicamba) in each of two succesive years. Additional work confirms that only high herbicidal rates are effective, and that best results come from August or September treatments. Since it takes about 10 times as much herbicide to kill creosotebush as certain other plants, such heavy treatments could be a danger to forbs and range grasses and might cause a residue problem in soil or runoff water.

Additives Tried with Low Rates

To try to overcome the necessity for heavy chemical applications and prevent erratic results, additives were tried with low rates of 2,4,5-T. Two rates of 2,4,5-T—0.25 and 2.0 lb/A—were tried in a foliar spray of 50 gallons per acre of diesel oil-water (1:9) emulsion. Dimethyl sulfoxide (DMSO) was added to each of these sprays at concentrations of 0, 10, or 50% by volume. In addition to the surfactant already in the 2,4,5-T, sorbitan monolaurate was added to the spray mixtures at either 0 or 0.5% concentrations.

The 2 lb/A rate of 2,4,5-T gave better control than the lesser rate regardless of additives (from 40% to 90% kill in 21 weeks). Adding the extra surfactant reduced early shoot formation, but made little difference in final shoot weight of surviving plants. The DMSO additions had no definite effects.

Of the different spray formulations tried, the one containing 2.0 lb/A 2,4,5-T, 50% DMSO, and 0.5% surfactant was most effective in killing creosotebush seedlings. This spraying resulted in 90% mortality by the 21st week after application. However, including the DMSO did not increase effectiveness enough to justify the additional cost.

There is no one answer to the question of whether to control creosotebush. However, recent results with moderate rates of Torden applied when plants are more susceptible indicate potential for chemical control. The final answer must be made individually, based on potential return from the land once it is reclaimed from this pest plant.