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Observations on Chemical Controls of African Rue and Syrian Beancaper in Western Nevada

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Introduction

African Rue (*Peganum harmula* L.) and Syrian beancaper (*Zygophyllum fabago* L.) are noxious perennial weeds currently found in Churchill and Mineral counties. They are scattered over approximately 400-500 acres, are spreading and pose a danger to low elevation, salt-desert shrub types in western Nevada. Complete descriptions and information on the ecology of these plants are available in University of Nevada Cooperative Extension fact sheets numbered FS-01-45, and FS-01-46.

Although these weeds are classified as noxious little information is available concerning successful chemical control techniques. The lack of information reduces the chance of success by landowners who want to attempt control of these plants using herbicides. Unfortunately, noxious weed species that occupy limited acreages receive little attention from chemical producers. This is due to the high cost of conducting replicated trials at diverse locations and the limited market potential for effective chemicals.

Control of these weeds is necessary and responsible landowners often cannot wait for replicated results before treating noxious weeds. The results reported

in this fact sheet were obtained as a result of control efforts by the Churchill County Mosquito and Weed Abatement District and the Nevada Division of Wildlife.

During the spring and fall of 2001, the authors applied three commonly used chemicals to populations of African rue and Syrian beancaper. They evaluated the final results in the spring of 2002.

Spring Treatment

On May 23, 2001 two adjacent colonies composed of scattered African rue plants (2-3 acres each) were sprayed with a tank mix of 1.6% Glyphosate®, 1.0% Weedone LV6® (2,4-D) and .05% Pro-Spreader® surfactant. The plants were sprayed until wet with a truck-mounted sprayer delivering the spray mixture at 42-pounds/square inch. All plants in the colony were treated. An adjacent colony was sprayed in the same manner with Arsenal® (Imazapyr) at 1.6% and .05% Pro-Spreader® by volume. The majority of the treated plants were in the bud to flowering stage when treated. The plants ranged in size from young seedlings to fully mature flowering plants. No Siberian beancaper plants were sprayed during the spring of 2001.

Fall Treatments

The chemical rates and spraying techniques were duplicated September 26, 2001 on two different colonies of scattered African rue plants that occupied approximately 1-2 acres each. A Syrian bean caper colony was treated with Arsenal® at approximately 2.5% by volume and .05% Pro-Spreader®. An adjacent colony was treated with Glyphosate® at 1.7%, Weedone LV6® at 1.0% and Pro-Spreader® at .05%.

The treated plants were showing signs of dormancy when they were sprayed. The rue was beginning to turn red, while the beancaper was beginning to yellow. The plants in the colonies represented all ages from small seedlings to mature specimens with old seedpods evident.

Evaluation

The effects of the herbicides on the spring treated African rue colonies were estimated in August of 2001 and May of 2002. The colonies treated were localized and all plants within each colony were treated as previously described. Two experienced observers estimated herbicide efficacy separately. Then results were compared and averaged to obtain an estimate of control.

The evaluation of the fall-treated African rue colonies differed in that all live rue plants were counted within the plots just prior to spraying in September of 2001. The number of surviving plants were counted again on May 9, 2002. The numbers of live plants observed were compared to the original number of plants to determine percent control.

Individual plants within the fall treated Siberian beancaper colonies were too numerous to count at time of spraying. The treated areas were staked when they were sprayed. The percentage of live plants remaining on May 9, 2002 was estimated separately by three experienced observers and the values were averaged to obtain the estimated control.

Results

Both African rue populations treated in the spring of 2001 displayed high mortality rates when observed the following August. The population treated with Arsenal® had achieved 100% kill when evaluated in 2001. The population treated with the glyphosate and 2,4-D mixture was evaluated as 75% killed at the first evaluation. The plants that remained green were mostly large, older specimens displaying various levels of damage. By and large the center portions of these plants remained unaffected by the spray. The evaluators speculated at the time that the herbicide spray had not penetrated the plants completely and mortality was reduced. Young, smaller plants displayed nearly 100% mortality following the treatment with Glyphosate® and 2,4-D when evaluated in August of 2001.

The same populations were evaluated again in May 2002 to determine survival one year following treatment.

The mortality of the population treated with Arsenal® was estimated at between 90-95% approximately one year after treatment. The surviving plants were very small, normally a single stem less than 6 inches in length. There was little evidence of herbicide damage evident on the surviving plants. They generally appeared vigorous, with normal color.

The population that had been treated with the tank mix of Glyphosate® and 2,4-D was generally unaffected after 1 year. The mortality was estimated at less than 10%. The plants had re-sprouted from existing plants that had appeared dead the previous summer. Surviving plants were represented all sizes and ages. Little to no evidence of herbicide damage was evident on the newly sprouted plants.

The populations of African Rue treated in September 2001 were evaluated for percent mortality on May 9, 2002. Each plant had been counted prior to the herbicide application during the previous fall. Surviving plants were recounted to determine percent mortality.

The Arsenal® treated population displayed an 88% mortality rate (168 plants at treatment with 20

plants surviving). None of the living plants showed evidence of herbicide damage and the survivors were uniformly small, single stemmed individuals. It is unknown if the surviving plants were “missed” during the treatment, were too small to have received adequate spray or were resistant to the material.

The population treated with glyphosate/2,4-D in September displayed a mortality rate of 33% (568 plants at treatment with 385 surviving). The living plants represented a cross section of age and size. Some herbicide damage was evident including stunting and discoloration.

Mortality of the Syrian beancaper populations treated in September was estimated as previously described. The arsenal treated population was estimated to have sustained a mortality rate of 90-95%. The majority of living plants displayed herbicide damage such as yellowing and distorted growth.

The population treated with glyphosate/2,4-D mix was estimated to have sustained approximately 70% mortality. Most of the living plants were discolored to some extent when compared to the unsprayed plants growing nearby.

Tables 1 and 2 are the spraying results displayed in tabular form. The treatments depicted are the same as those detailed in the narrative.

Table 1. Treatment results for African Rue

<u>Treatment</u>	<u>Evaluation Date</u>	<u>% Control</u>
Glyphosate/2,4-D	August,2001	75
May 2001 application	May, 2002	10
Arsenal	August, 2001	100
May 2001 application	May, 2002	95
Glyphosate/2,4-D	May, 2002	33
Sept. 2001 application		
Arsenal	May, 2002	88
Sept. 2001 application		

Table 2. Treatment results for Syrian Beancaper

<u>Treatment</u>	<u>Evaluation Date</u>	<u>% Control</u>
Glyphosate/2,4-D	May, 2002	70
Sept 2001 application		
Arsenal	May, 2002	95
Sept. 2001 application		

Summary

African Rue populations were greatly reduced by a spray consisting of 1.6% Arsenal® (Imazapyr) and 0.05% Pro-Spreader® by volume in water. The plants were sprayed to wet with little to no runoff at time of treatment. The populations displayed a mortality rate of approximately 90%-95% under a spring or fall treatment.

The rue populations treated with a mixture consisting of approximately 1.6% Glyphosate®, 1% Weedone LV6® and 0.05% Pro-Spreader® by volume displayed less than 10% mortality after one year when sprayed in the spring (May). The control was approximately 33% when the plants were sprayed in September and evaluated in May of the following year.

Syrian beancaper populations were reduced by over 90% when sprayed in September with a mixture of Arsenal® (2.5%) and 0.08% Pro-Spreader® by volume.

The Beancaper populations sprayed with a mixture of Glyphosate® (1.7%), Weedone LV6® (1.0%) and Pro-Spreader® at 0.05% by volume in September were reduced by approximately 70% when evaluated the following spring.

The results observed in these trials have not been replicated in space or time. However, the observations recorded can be used as a starting point for a control program or for further experimentation by others faced with controlling these problem weeds.

Literature used to prepare this Fact Sheet

Davison J., and M. Wargo. 2001. Recognition and Control of African Rue in Nevada. Fact Sheet # FS-01-45. University of Nevada Cooperative Extension, Reno Nevada. 4 pp.

Davison, J., and M. Wargo. 2001. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. Fact Sheet # FS-01-46. University of Nevada Cooperative Extension, Reno Nevada. 4pp.

Parker D., and M.H. Reiser. 1997. Low-Impact, Selective Herbicide Application for Control of African Rue. A preliminary field guide. United States Department of Agriculture, Forest Service Southwestern Region publication. 4 pp.