

African rue (*Peganum harmala*) is native to North Africa and to the Mediterranean region. It was introduced into the U.S. around the 1920s and was first noticed in the Deming area, but is now common near Carlsbad and throughout southern New Mexico. The plant favors disturbed and barren areas such as oil pads, roadsides, parking lots, corrals, stockyards, and abandoned crop fields. African rue is expanding into rangeland and can dominate pastures because it is very drought tolerant. The plant's deep and robust perennial root system is a major obstacle to plant control.

African rue is a small, bright green, succulent perennial herb with a bushy growth habit that reaches about one foot in height at maturity. The plant dies back to its roots in winter and initiates new growth in late March in southern New Mexico. After spring growth, the plant often becomes senescent as soils dry in early summer, but then will undergo a second growth phase later in the season as rains are received. Leaves are alternate, smooth, and divided deeply into narrow lobes. Single flowers are borne along the stem and in the leaf forks. Flowers have five white petals and produce a cylindrical, two- to four-celled fruit with many seeds.

African rue is known to contain four poisonous alkaloids and is toxic to cattle, sheep, and horses. The effects on livestock include loss of appetite, trembling, and loss of coordination. Severe poisoning can result



Photo courtesy of Chris Allison. (Used with permission).

in hemorrhaging in the heart and liver. Because of its bad taste and smell, livestock usually avoid the plant unless other forages are unavailable. The seeds are the most toxic part of the plant, with leaves somewhat less toxic.

WHY HERBICIDE APPLICATION

Because of African rue's elaborate root system, efforts to eliminate the plant by means other than herbicidal control are very difficult. The plant quickly grows back after mowing or burning, and deep cultivation only divides and spreads the roots. Numerous herbicides have been investigated for African rue control in field tests conducted by New Mexico State University, but only chemicals that are moved deep into the plant's root system have

¹Respectively, Retired Range Management Specialist and Professor, Department of Extension Animal Sciences and Natural Resources; and Retired Extension Brush and Weed Specialist and Professor, Agricultural Science Center at Artesia, New Mexico State University.

shown to be effective. Foliar-active herbicides must be applied when the plant is actively growing to maximize chemical uptake and movement (translocation) through all portions of the plant.

Soil-active herbicides are applied to the soil surface and must move through the soil after rain events, which are often minimal and infrequent in southern New Mexico. Herbicide control by either foliar- or soil-active methods is usually slow, requiring a year or more to kill a plant that is individually or broadcast sprayed.

GENERAL CONSIDERATIONS

Weather conditions at the time of spraying are extremely important to successful herbicide activity. Coverage is best with low wind speeds and cool temperatures. High air temperatures increase the spray solution volatility, reducing the amount of herbicide that can be absorbed by the plant. Optimal wind velocity is 3 to 8 mph, and air temperature should be above 50°F but below 85°F. Do not spray a foliar-active herbicide if a rain storm is expected within six hours of application.

The plant condition and growth stage at the time of application are critical for control success. Spraying African rue in the early vegetative and bloom stage in spring (April) is optimal. Do not spray African rue that has been stressed from drought, disease, insects, or other causes that might have resulted in plant damage.

Herbicides recommended for African rue control often damage other plants as well, in particular grasses. Thus, spraying should not be conducted in areas where grass preservation is desired. Individual plant spraying will minimize grass damage relative to broadcast spraying, but still expect some damage.

SPECIFIC GUIDELINES

Broadcast Foliar Spray Treatment

The proper time for foliar spray varies from year to year because of specific weather conditions. Expect average to above average winter moisture to produce a prolific burst of vegetative growth on African rue in spring, which is desirable before spraying. In droughty years, African rue will have poor vegetative and flower growth, and spraying is

Table 1. Recommended Spray Mixtures for Broadcast Application on African Rue

Trade name	Herbicide chemical name	Rate of product/acre	Rate of active ingredient (a.i.)/acre
Arsenal, Habitat	Imazapyr	3 pints	0.75 lb
Escort, Ally	Metsulfuron	3.2–6.4 oz	2–4 oz
Spike 20P*	Tebuthiuron	10–15 lb of pellets	2–3 lb

Imazapyr provides best control under most New Mexico conditions.
* Apply only on sandy soils.

not recommended. At the time of spraying, the soil temperature at a 6-inch depth should be between 70° and 50°F. In most years, the application season and this soil temperature range occurs roughly from April 1 to May 15, plus or minus 15 days.

Mixes with imazapyr alone or in combination with other herbicides have consistently provided the best African rue control in New Mexico (Table 1). Imazapyr is very active on the root system and is the most common product used for commercial African rue control. Imazapyr is usually applied at a rate of 0.75 lb active ingredient (a.i.) per acre, which is equivalent to 3 pints of product per acre. A surfactant should be added to the herbicide mixture at rates specified on the herbicide label. Imazapyr is a nonselective herbicide, so anticipate damage to nearby plants.

Metsulfuron is another herbicide that provides fair to good African rue control when applied at a rate of 2 oz a.i. per acre or higher. Metsulfuron is formulated as a 60% active dry flowable material that is mixed in water and sprayed as a liquid. Metsulfuron is very active on broadleaf weeds, but typically results in less harm to grasses than spraying with imazapyr.

Broadcast Soil Spray Treatment

African rue growing on rangeland with sandy soils and mixed brush may be controlled with tebuthiuron. Unlike the liquid foliar-active herbicides, tebuthiuron is a dry pellet formulation that dissolves and moves into the soil with rainfall and is absorbed by the roots. Tebuthiuron provides fair to good African rue control. However, a relatively high rate of application is required and the herbicide

Trade name	Herbicide chemical name	Rate of product	Solution or spray suggestion
Velpar	Hexazinone	4 ml squirted on the soil surface next to each treated plant	Mix 50:50 with water in a backpack sprayer
Arsenal, Habitat	Imazapyr	1–3% mixed in water	Spray foliage to wet
Hexazinone provides best control under most New Mexico conditions.			

will likely damage nearby vegetation. This herbicide can be applied at any time of the year, but prior to anticipated rainfall is optimal. The principal use of this herbicide when applied at lower rates is for control of woody shrubs, such as creosote, oaks, and sagebrush.

Individual Plant Treatment (IPT)

For practical reasons, IPT is used in areas where African rue is growing sparsely and is easy to treat. IPT is an effective way to control the plant but the method is time consuming and costly if the African rue population is dense. Adding a blue dye to the spray mixture helps to identify treated plants.

Hexazinone is a liquid that is applied to the soil surface next to individually treated plants (Table 2). Hexazinone moves into the soil profile with rain and is taken up by roots. Application before anticipated rainfall is therefore preferred, but the product usually works at any time of year. For IPT, hexazinone should be diluted as a 50:50 mix with water in a backpack sprayer. A quick squirt of the handle with the nozzle turned to a straight stream generally administers about 4 ml of solution, which is the desired rate of application. Check the handle pressure and practice with water in the sprayer to calibrate this delivery rate.

Imazapyr diluted as a 1–3% mixture with water is another effective IPT. A backpack sprayer with its nozzle adjusted to wet the foliage provides satisfactory control.

For more information about controlling African Rue and other brush and weed species, contact your county Extension agent (<http://aces.nmsu.edu/county>).

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