

# African Rue

## Biology and Management



African rue (*Peganum harmala* L.) is a toxic and highly invasive nonnative plant that infests much of the western and south-western United States. It is a native of the deserts of Africa and southern Asia that was first noticed in the United States near Deming, New Mexico in 1930. It is now a significant problem in New Mexico, Arizona, California, Nevada, Idaho, Oregon, Washington and the far western part of Texas (especially Reeves, Loving, Ward, Pecos and Crane Counties).

### Recognizing the plant

In western Texas, African rue begins growing in late spring, earlier than most native warm-season plants. Young plants are bright green, but turn darker green as they mature and reddish when dormant. When crushed, the leaves have a very disagreeable odor.

The plants grow to about 1 foot tall and are bushy with many branches. Leaves are alternate, without hairs, and are divided into narrow segments. The flowers consist of five white petals. The fruit develops soon after flowering. Each plant may produce as many as 1,000 fruits, with each fruit containing 40 to 50 seeds. African rue's taproot has many branches that may grow 20 feet deep to follow water. Thus, the plant is extremely tolerant of drought. It reproduces mainly through its seeds, but it also can spread rapidly from roots or root fragments. During the summer African rue usually dies back to the base. With cooler temperatures and more moisture in the fall, the plant regrows. Fall regrowth is less upright, with branches leaning toward the ground. At this time the plant grows only vegetatively, probably because it is storing carbohydrates for the dormant months.

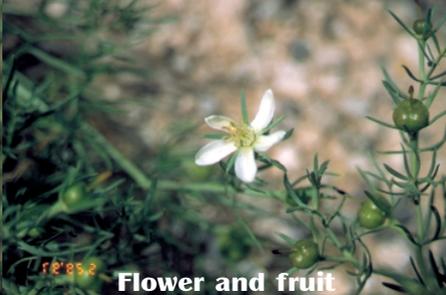
Charles R. Hart

Associate Professor and  
Extension Range Specialist

The Texas A&M University System



Flower



Flower and fruit



Root

African rue grows in many types of soil, including alkaline and saline soils. It spreads rapidly into disturbed areas, roadsides, oilfield pads and desertified rangeland. It may contain allelopathic substances that prevent the growth of other plants.

## Managing toxicity

African rue is toxic to cattle, sheep and probably horses. The most toxic parts of the plant are the seeds and fruits, with a lethal dose of 0.15 percent of the animal's body weight. Young leaves are a little less toxic and dry leaves are apparently nontoxic. Fortunately, the plant is very unpalatable to livestock and most will eat it only if forced to by starvation or mineral deficiencies.

Signs of **chronic** poisoning in animals are:

- loss of appetite
- listlessness
- weakness of the hind legs
- knuckling of the fetlock joints

Signs of **acute** poisoning in animals are:

- stiffness
- trembling
- incoordination
- frequent urination

The body temperature of poisoned animals is usually below normal. They salivate excessively, wetting the lower jaw and muzzle. Post-mortem examination may reveal hemorrhages in the heart and liver.

The most dangerous time of the year for livestock is spring and summer when the plant's seeds are present and acute poisoning may occur. Do not graze areas infested with African rue during this time, especially if little other grazeable forage is available. If symptoms of chronic poisoning appear, remove animals and give them good quality feed and water; chronic poisoning cases generally recover.

Maintaining a proper stocking rate is the first step in preventing toxicity problems. Do not over-graze land, especially if this could force animals to consume African rue.



## Controlling African rue

Where African rue dominates the plant composition and has replaced desirable native plants, it may need to be controlled. Given its aggressive nature, the plant is extremely hard to control with mechanical techniques. Mowing or blading causes the plant to re-sprout and spread. Grubbing individual plants is nearly impossible because the roots are too deep to dig out and any root left in the ground may re-sprout. Continued grubbing year after year may eventually control individual plants. Repeated deep cultivation (10 to 12 inches), combined with re-seeding perennial plants, has been somewhat successful but is expensive.

The most practical and economical way to control African rue is with herbicides. Treatments are specific, depending on the type of soil and the environmental conditions. Use broadcast methods to treat large areas that are heavily infested. Use individual plant treatment methods for smaller areas or scattered infestations.

### On rangeland

For large areas densely infested with African rue, broadcast Spike 20P™, a pelleted herbicide that works best in loose soils such as sand, loamy sand or sandy loam. It can be applied with ground application equipment.

To treat smaller areas or sparsely scattered plants, apply Velpar L™, a herbicide that must penetrate into the root zone. Apply it undiluted to the soil directly below the plant canopy. Velpar L™ is nonselective and will kill grasses in the immediate application area.

Both Spike 20P™ and Velpar L™ can move off the application area and should not be used on slopes or near desirable plants.

**Table 1. Recommendations for controlling African rue on rangeland.**

Herbicide	Broadcast rate (a.i./acre)	Individual plant treatment rate	Time to apply	Remarks
Spike 20P™	1.5 pounds		Anytime of year	Do not use when plants are growing on heavy clay or compact caliche soils.
Velpar L™		2 ml/foot of canopy	April through October	Do not use when plants are growing on heavily compacted caliche soils.

## On rights-of-way and noncropland areas

African rue often grows along caliche roadsides and on caliche oilfield pad sites. Soil-applied herbicides do not work well in such areas because the soil infiltration rates are extremely slow and the caliche binds the herbicide (making it less available to the plant roots). On these sites, use Arsenal™, a liquid herbicide diluted in water and applied to the foliage. Table 2 shows both broadcast and individual plant treatment rates. For best results, treat in the fall when plants are actively growing. Use this product with caution because it can damage desirable plants. When African rue is growing with desirable plants, use the individual plant treatment method.

For broadcast treatments, combine the recommended rate of Arsenal™ (2 pints) with 0.25 percent nonionic surfactant in water. Use ground application equipment to deliver 10 to 25 gallons per acre of total spray volume.

For individual plant treatments, use 0.5 percent Arsenal™ with 0.25 percent nonionic surfactant in water. Mix thoroughly. Add a blue dye to identify treated plants. Table 3 gives mixing instructions for various tank sizes. Spray each plant thoroughly to the point of glistening, but not to the point of runoff.

**Table 2. Recommendations for controlling African rue on rights-of-way and noncropland.**

Herbicide	Broadcast rate (a.i./acre)	Individual plant treatment rate	Time to apply	Remarks
Arsenal™	0.5 pounds (2 pints of product)	0.5%	Late September through October (or to first frost)	Apply to fall regrowth that is in good growing condition. Use the individual plant treatment method near desirable vegetation.

**Table 3. Mixing instructions for individual plant treatments with Arsenal™.**

Ingredient	Percent	Ounces of ingredient for various tank sizes					
		1 gal.	4 gals.	15 gals.	30 gals.	55 gals.	125 gals.
Arsenal™	0.5	0.64 oz.	2.6 oz.	9.6 oz.	19.2 oz.	35.2 oz.	80.0 oz.
Surfactant	0.25	0.32 oz.	1.3 oz.	4.8 oz.	9.6 oz.	17.6 oz.	40.0 oz.
Dye	0.25	0.32 oz.	1.3 oz.	4.8 oz.	9.6 oz.	17.6 oz.	40.0 oz.

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