Sulphur-flower Buckwheat

Eriogonum umbellatum (ERUM)

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Sulphur-flower buckwheat (*Eriogonum umbellatum* Torr. [ERUM]) (Figure 1) is a widespread species with many subspecies in the western United States and Canada. Production of sulphur-flower buckwheat seed adds to the array of native forb seed available for Great Basin rangeland restoration and reclamation projects. It is also an attractive plant for use in low maintenance landscaping or xeriscaping. The data summarized here provides interested growers with sulphur-flower buckwheat seed production techniques that reduce crop failure and increase seed yields.

Figure 1. Sulphur-flower buckwheat with umbels in full bloom

Uses

Plant sulphur-flower buckwheat seed with a mixture of forb, grass and shrub seeds to create diverse native vegetation communities where local seed sources have been lost. For example, sage-grouse use native vegetation for cover and forage. Sulphur-flower buckwheat flowers can attract and increase valuable pollinator populations, which in turn provide a major protein source for young, fast-growing sage-grouse chicks.

Description and natural adaptation

Sulphur-flower buckwheat is a native, mid-season herbaceous perennial in the Buckwheat Family (Polygonaceae). It occurs over a wide range of elevations from the Pacific coastline to the eastern Great Plains. Sulphur-flower buckwheat grows in dry, well-drained soil. Plants are adapted to low precipitation and hot summers.

Sulphur-flower buckwheat is anchored by a well-developed taproot. The woody crown branches profusely and produces tufts of leaves at the nodes. Plants grow from 4 to 12 inches high. Showy yellow flowers form on several-rayed, umbrella-like clusters, which rise 3 to 8 inches above the leaves. Plants in different localities may differ in growth form, leaf size and flower color that vary in relation to genotype, elevation and precipitation.

Plants bloom from late May until mid-July, depending on the location and winter and spring precipitation. Seed maturation depends upon the subspecies location and the length of blooming period, and generally occurs between late July and early August. Seeds are dispersed in August and September depending on location and weather conditions.

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Preproduction considerations

Native forb seed production poses many challenges, but using the appropriate management practices for each species can diminish grower risk. Using appropriate production practices will maximize seed yields and deliver high quality products over time. Before planting, it is important to consider a number of important factors. These include site evaluation of soil texture, weed seed bank pressure, presence of perennial weeds, irrigation delivery systems and harvest management. Native forbs found in semi-arid regions often grow in shallow soils with a relatively high pH (8.0–8.5).

Native seed production may be utilized as an alternative rotational field crop like other perennials, such as alfalfa. Since native forbs require limited irrigation, growers with water restrictions can use the saved allotments elsewhere.

Establishing sulphur-flower buckwheat

Sulphur-flower buckwheat seed production requires a minimum of 2 years for plant establishment, and seed yields may not be profitable for several years. The species is long-lived and after establishment will have several productive seasons.

Direct fall planting has been shown to produce well-established spring stands (Figure 2) and may yield a small summer crop. Spring planting generally requires pre-plant seed treatments such as cold-wet stratification for a period of 3 to 5 weeks.

Figure 2. Sulphur-flower buckwheat spring seedlings

The planting rate for sulphur-flower buckwheat is about 2.25 lb/acre of pure, live seed. A pound of sulphur-flower buckwheat seed contains 145,000 to 155,000 seeds (achenes) (Figure 3). Consult your seed supplier for purity and viability or germination test results.

Figure 3. Sulphur-flower buckwheat seed (achenes)

Irrigation methods and requirements

Irrigation methods, timing and delivery determine plant vitality, seed yield and quality. Sulphur-flower buckwheat has a relatively low irrigation requirement. Subsurface drip, furrow or sprinkler irrigation delivery systems may produce suitable stands. Using subsurface drip systems, 8 inches per year of irrigation was adequate at Ontario, OR, which receives 10 inches of precipitation per year. In comparison, traditional row crops at Ontario may require up to 36 inches of irrigation per year. Established sulphur-flower buckwheat subsurface irrigation scheduling consisted of four irrigation applications. Beginning at the onset of flowering, 2 inches of water was applied every 2 weeks (Figure 4, page 3).

Besides reducing water consumption, subsurface drip irrigation also provides a precision delivery system, possible irrigation automation, decreased weed pressure, and better field access for implements. Drawbacks of subsurface drip irrigation include startup and maintenance costs. Growers new to drip irrigation might want to begin with a simple system on a small acreage.

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Figure 4. Eriogonum grown with subsurface drip irrigation

Seed source

Seed sources for crop production of sulphur-flower buckwheat must be designated 'certified' to guarantee noxious-weed-free supplies. Because there are a number of sulphur-flower buckwheat subspecies, it is important to obtain the subspecies that is both in demand by the market and also reasonably well adapted to the planting location.

Seed sources may include foundation seed organizations, crop improvement associations, National Resource Conservation Service (NRCS) Plant Materials Centers, or private seed companies.

Site preparation

Fall soil preparation should begin long before planting. Choose fields that are relatively weed free with no troublesome perennial weeds. For subsurface drip irrigation, place drip tape 12 inches below the planting soil surface, centered between where plant rows will be sown. Ground preparation should create a smooth, level, firm seedbed for accurate, shallow seed placement.

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Figure 5. Pollination of sulphur-flower buckwheat

Pollinators

Bee pollination can increase the yield of sulfur-flower buckwheat seed (Figure 5). Suggested stocking density is one strong honeybee hive per acre (Jim Cane, USDA-ARS Bee Biology and Systematics Lab; personal communication).

Weeds, pests and diseases

Weed pressure is a primary concern for sulphur-flower buckwheat growers. Weed problems can be managed with cultivation and hand rouging. Presently, no herbicides are labeled for use on this native forb seed crop.

Like other specialty seed crops, native forb seed must be free of invasive weed seeds and limited in noxious weed seeds to less than 1 percent.

Relatively little pest and disease pressure has been found with sulphur-flower buckwheat seed production. Rust may need control. Excessive irrigation may cause secondary infections and disease.

Harvesting

The harvest period for sulphur-flower buckwheat is late July to early September, depending on elevation, latitude and variety. Seeds are mature when the bracts are dry and papery. Seeds persist on the plants for 1 to 3 weeks following maturation.

The uniform maturation of sulphur-flower buckwheat and seed stability on the flowering structure allows for standard combine harvesting methods (Figure 6, page 4).

Seed yield (lb/acre) from sulfur-flower buckwheat established in the fall of 2004 at the subsurface irrigation rate of 8 inches per season.*

2006	2007	2008	2009	Avg.
371.6	193.8	245.2	240.1	262.7

*Shock, C. et al., 2010

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Figure 6. Combine harvesting of sulphur-flower buckwheat

Seed cleaning and conditioning

Thresh combined material using a "dewinger," barley de-bearder, or brush machine. Remove fine material such as bract, leaf and stem debris using an air-screen separator. Trashy seed lots may first be run through the air-screen separator to remove large stems and leaves. This is usually not necessary when seed is harvested by combine.

Post-harvest seed conditioning involves proper drying techniques. Low-volume warm-air drying reduces seed moisture content and prevents seed damage. Seed moisture content should not exceed 15 percent for proper storage.

Seed certification and marketing

Viability or germination and purity as well as certification should be provided for all certified seed produced. Marketed seeds should be cleaned to 95 percent purity. Jorgensen and Stevens (2004) recommended that purchased seed have a minimum germination percentage of 75 percent.

Seed production contracts with government agencies or private corporations are viable options for marketing sulphur-flower buckwheat. There is also a developing niche market for sulphur-flower buckwheat seed in the expanding sector of home xeric gardening.

Resources

BLM Seed Procurement http://www.blm.gov/or/procurement/index.php

Drip Irrigation: An Introduction http://extension.oregonstate.edu/catalog/pdf/em/em8782-e.pdf

Great Basin Native Plant Selection & Increase Project http://www.fs.fed.us/rm/boise/research/shrub/greatbasin.shtml

Idaho Crop Improvement Assn. Seed Certification http://www.idahocrop.com/

Jorgensen, Kent R. and Richard Stevens. 2004. Ch. 24. Seed collection, cleaning, and storage. In: Restoring western ranges and wildlands. Gen. Tech. Report RMRS-GTR-136-vol.3. Ft. Collins, CO: USDA FS, Rocky Mtn. Research Station. pp. 699–716 http://www.fs.fed.us/rm/pubs/rmrs_gtr136_3.pdf

Oregon State Seed Certification Service http://seedcert.oregonstate.edu/home

Oregon State University Malheur Experiment Station http://www.cropinfo.net

Shock, Clinton, Erik Feibert, Monty Saunders, and Nancy Shaw. 2010. Native Wildflower Seed Production with Limited Subsurface Drip Irrigation. pp. 193–209 in Malheur Experiment Station Annual Report 2009. http://www.cropinfo.net/AnnualReports/2009/ForbIrrigation2009.html

USDA, NRCS 2010. The PLANTS Database http://plants.usda.gov/

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