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Seed Production by the Non-Native Sahara Mustard

Since its introduction from the semi-arid and arid desert of North Africa, the Middle East, and the Mediterranean regions of southern Europe, Sahara mustard *(Brassica tournefortii)* has spread throughout the southwestern deserts of North America, where it is most common on roadsides, abandoned fields, and sand dunes. Sahara mustard poses threats to native desert vegetation by using soil moisture and mineral nutrients needed by native plants. By creating a continuous fuel load in areas where fuels are otherwise scarce and fires infrequent, Sahara mustard has the potential of increasing fire return intervals. Many native desert species are not adapted for fire, and their populations generally take much longer than non-native species to reestablish following fire. Roadsides offer increased soil moisture from rain run-off, and Sahara mustard's sticky seeds can spread along roadsides by adhering to vehicles. In a recent issue of *Madroño,* USGS research scientists Melissa Trader, Dr. Matt Brooks, and Julie Draper evaluated the relationships of Sahara mustard seed count and biomass with plant density and biomass.

Management Implications:

- Seed production should be considered when implementing control efforts and when creating effective follow-up strategies for any annual plant species, including Sahara mustard.
- Control efforts that only reduce density of Sahara mustard and do not completely remove all reproductive individuals may inadvertently increase growth and reproductive output of those that remain.
- Sahara mustard can produce several germination cohorts per year, and additional treatments may be required to remove all cohorts, as well as those which survived previous control treatments.
- It is advisable to focus control efforts on repeated treatment and monitoring of smaller areas, than single treatments of larger areas.

The authors quantified plant biomass and seed production for Sahara mustard from three sites spanning the Mojave and Sonoran deserts in California and Arizona, near the area of initial colonization and in the paths of its spread southeast and northeast into these deserts. Each site was located along a paved road with adjacent wildland area, where there was minimal disturbance except for the road. The authors found strong linear relationships between plant biomass and seed production, with larger plants producing more seeds per plant and greater seed biomass per plant. Both seed count and seed biomass were also greater in $0.25m^2$ plots that had higher plant biomass. The law of constant final yield and the results of this study suggest that plots that are only thinned during control efforts for Sahara mustard, leaving some individuals alive (e.g., hand-pulling or spraying a site once and not returning to look for survivors), are not likely to reduce seed production and may inadvertently produce more standing biomass and have higher seed production than plots that are left untreated. The net result may be a more plentiful seed bank than would have existed if the smaller, less productive plants were left in place.

Currently, little information about this plant exists in the literature, and additional research is necessary to create effective management plans. Information is needed to evaluate Sahara mustard seed bank dynamics, seed longevity and persistence in soil, and the effects of plant density, microhabitats, and roads on seed production.

Trader, M. R., M. L. Brooks, and J. V. Draper. 2006. Seed production by the non-native Brassica tournefortii *(Sahara mustard) along desert roadsides. Madroño 53:313–320.*