

Sahara Mustard (*Brassica
tournefortii*)
Along Desert Roadsides

Presented
by
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Roadsides As Corridors for Invasion

- Disturbance created along roadsides often promotes invasion of exotic species
- Precipitation runoff onto roadsides creates an environment which enhances growth of roadside vegetation
- Roads create corridors for the dispersal of exotic plant seed

A Better Understanding of Plant Invasions

- What biological characteristics have promoted invasion of *Brassica tournefortii*?
- What physical habitat characteristics have promoted invasibility of this species?
- What control methods have been successfully used in controlling the species?

Sahara Mustard- Introduction and Distribution

- Sahara mustard is native to north Africa, the middle east, and the Mediterranean lands of southern Europe
- It is thought to have been brought over with the importation of date palms and was first collected in north America in Coachella valley riverside county, CA
- Since it has been found throughout the Mojave and Sonoran deserts and can be found in southern California, southern Nevada, Arizona, new Mexico, and west Texas

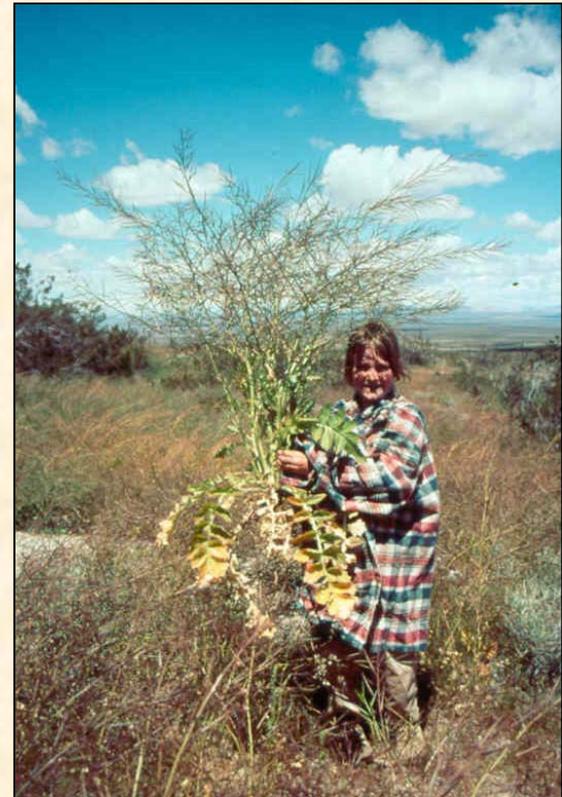
Issues Concerning Sahara Mustard As an Invasive

- Ability to compete with native plants for limiting soil water and mineral nutrients
- Its potential to smother native plant seedlings with extensive rosettes.
- Ability to carry fire in an otherwise fire-resistant landscape.



Management Need

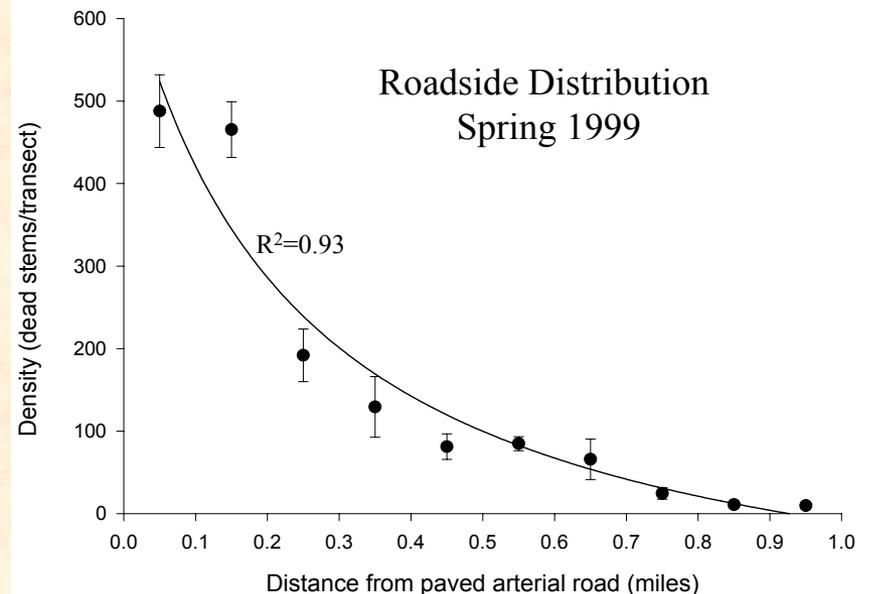
- The invasive mustard *Brassica tournefortii* is rapidly spreading along roadsides throughout the Mojave and Sonoran deserts.
- Its prolific biomass production make it a significant competitive threat to native plants, and a potentially significant fuel source that could promote desert fires. It is one of the main species of concern for the Mojave weed management area.



Spread of *Brassica tournefortii* Into Wildland Areas From a Roadside in the Chemehuevi Valley

(Berry and Brooks, in Preparation)

- Compared stem density of the invasive mustard *Brassica tournefortii* at various distances up to 1 mile from the verge of a paved arterial road.
- This species was not previously detected at this site during plant surveys in 1977, 1979, 1982, 1988, and 1992.
- It therefore invaded and spread to its current distribution within 7 years.
- The road effect was significant for up to 1 mile.



Production On Roadsides

- This project was initiated as a pilot study with minimal sampling effort at 3 study sites in FY03.
- In an attempt to determine how roads facilitate invasion, we compared stem density, plant biomass, seed density, and seed biomass of *Brassica tournefortii* in the verge and 20m from the verge of paved arterial roads and limited-access highways in the Mojave and Sonoran deserts.

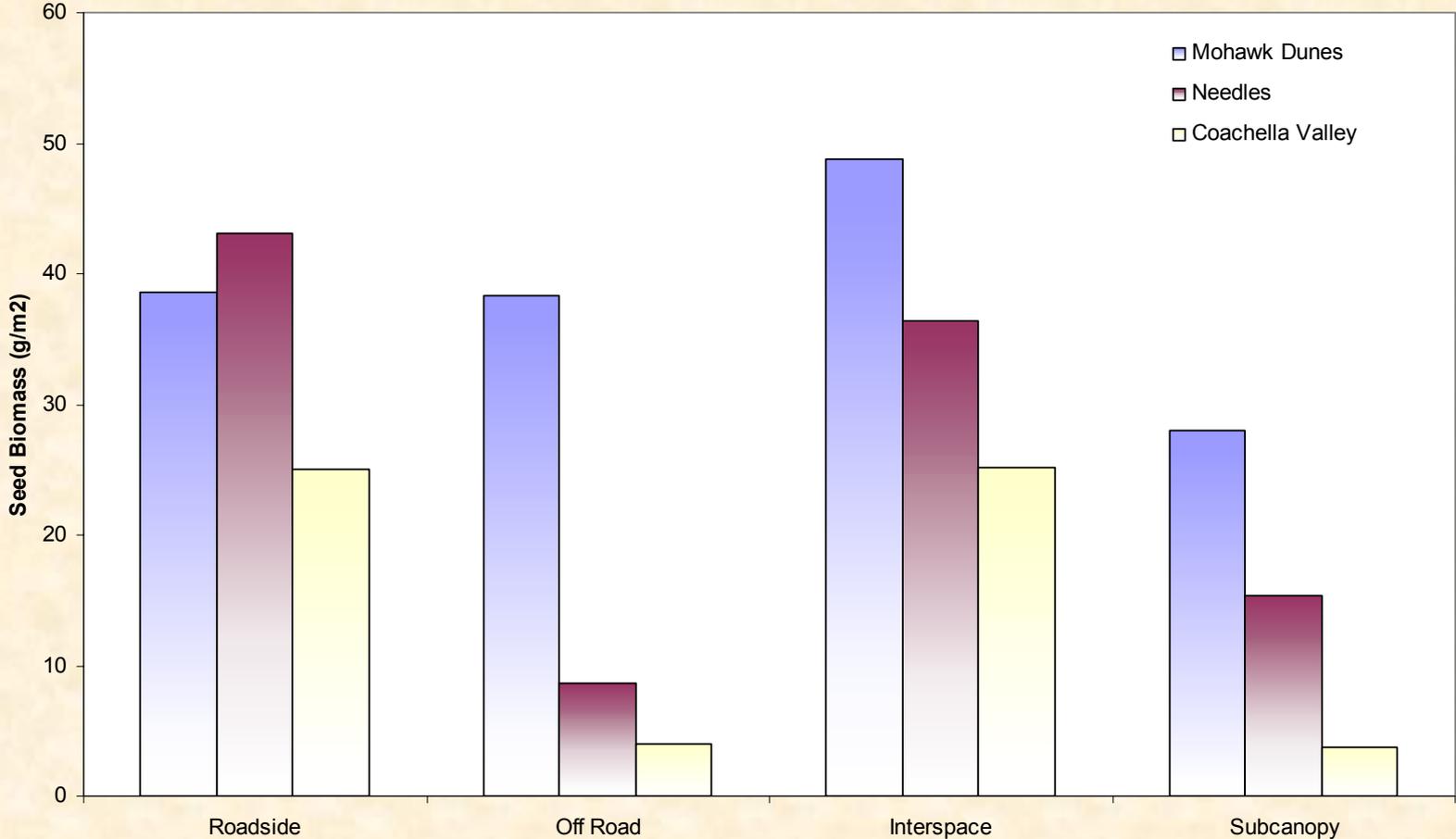


Road and Microhabitat Effects

- Number of seeds produced was found to be significantly different at the .05 level for microhabitat location and site location.
- Seed weight was found to be significantly different at the .05 level for both road location microhabitat location.

Seed biomass was found to be significantly different between the roadside and the surrounding wildland area and between interspaces and beneath shrub canopies

Roadside Effects on Seed Biomass



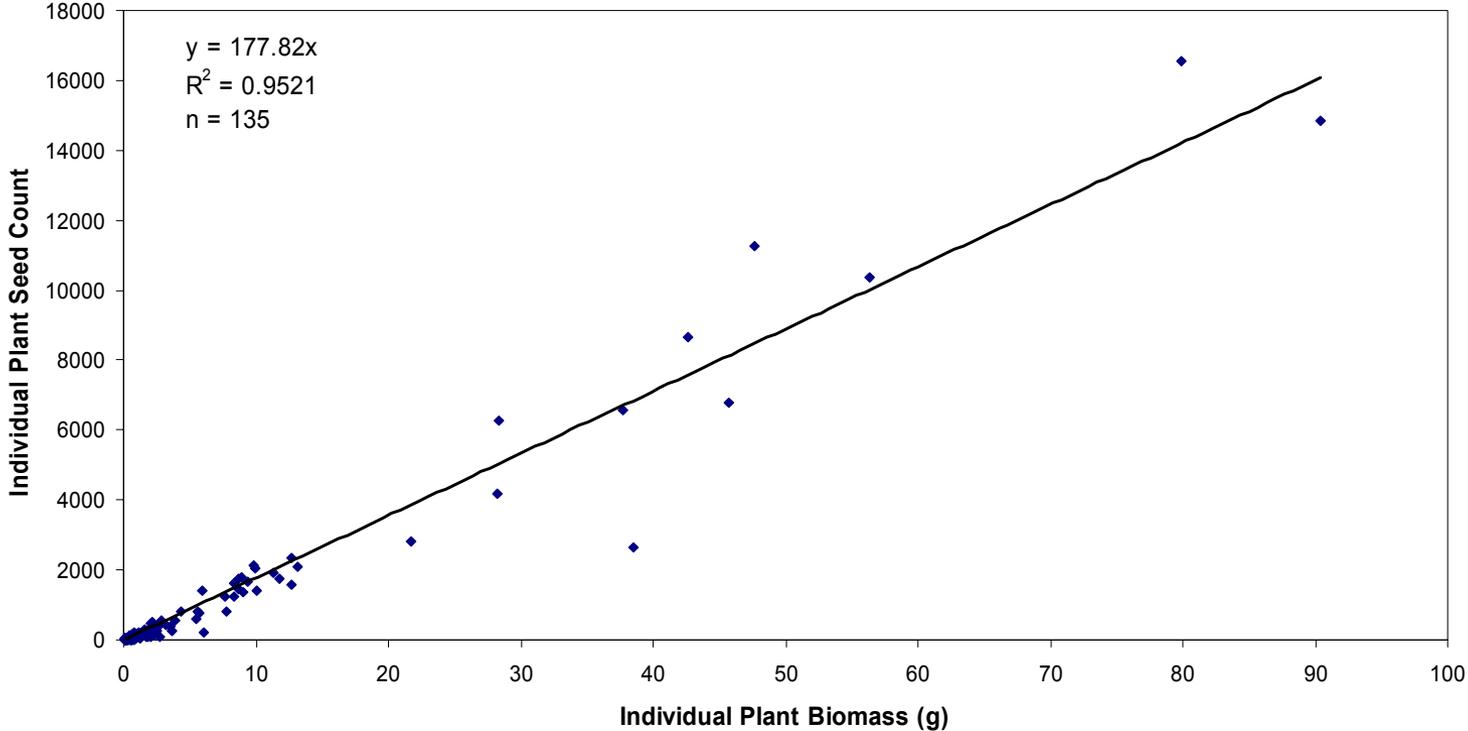
Mohawk Dunes- Sandy Soils



Coachella Valley and Needles site- Both with loamy, rocky soils

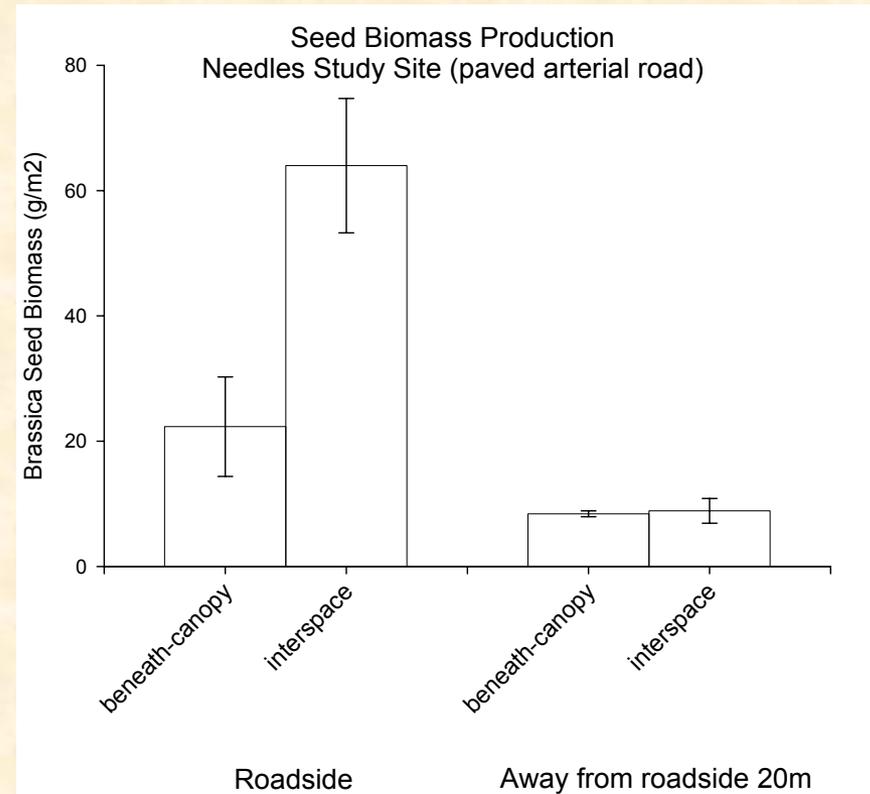
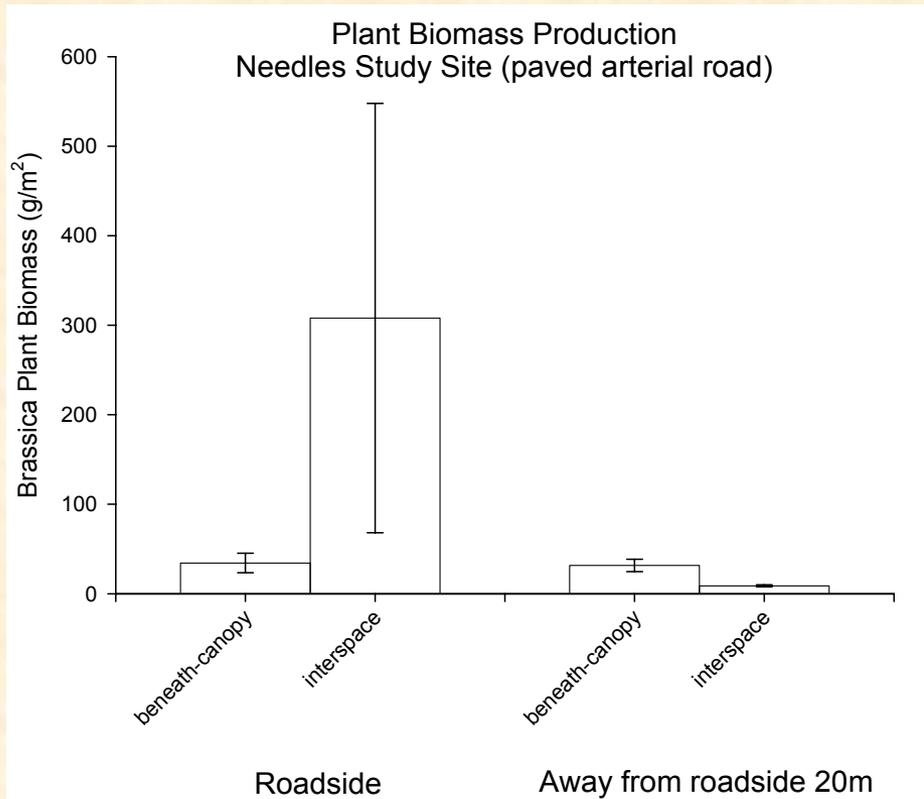


Brassica tournefortii Seedcount Vs. Plant Biomass



Brassica tournefortii biomass and seed production

- On average production was higher on roadsides than 20m away from roadsides.
- Difference was due to high productivity within interspaces.



Conclusions

- Trends show that a roadside effect is present in terms of *Brassica tournefortii* production.
- *Brassica tournefortii* seems more likely to invade wildland areas where the soils are sandy as opposed to loamy, rocky soils.
- Differences in production between roadside and wildland areas are much greater in the interspace than beneath the canopy.
- This information can have important consequences when deciding where to apply limited resources for restoration efforts.

Future Research Needed

- More in depth research is needed to verify the effects roadsides have on *Brassica tournefortii* production

H_A: Brassica tournefortii production will generally be greater at roadsides than in interspaces.

- We need to evaluate *Brassica tournefortii* invasions in a temporal and spatial manner so that we can better assess urgency in treating one type of habitat more than another (e.g. Sandy soils versus loamy soils).

H_A: Brassica tournefortii encroachment may occur more rapidly in sandy soils than in loamy soils.

H_A: Brassica tournefortii production will decrease further away from a roadside.

- Research needed to assess effectiveness of various control methods of the species

Approach

- Describe the basic ecology of Sahara mustard, and evaluate its potential as a fuel for fire.
- Evaluate the effects of mechanical and herbicide control methods on Sahara mustard, and determine the net effects of these treatments on native plants.
- Focus on the seedbank as the response variable.

Evaluating Control Methods

- **Purpose-** To evaluate the effectiveness of some common weed control methods in controlling Sahara mustard.
- **Study area** is located near Johnson Valley, San Bernadino County, California.
- **Primary goal** is to measure response of aboveground biomass, stem density, and seedbank density of Sahara mustard. **Secondary goal** is to evaluate effects of treatments on other plant species.

Treatments

- Apply herbicide Glyphosate (Roundup) at 2% solution- Applied February/March 2004.
- Hoe plants at the rosette stage and leaving plants on site- Applied February/March 2004.
- Mechanical and some herbicide plots were treated in 2003, early senescence of all plants made treatment effects undetectable.

