National Park Service
U.S. Department of the Interior

Lake Mead National Recreation Area

2005-NPS-532-P

Threats research and monitoring on the invasive species Sahara mustard (*Brassica tournefortii*)

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Hypothesis 1: Unripened seed pods from Sahara mustard plants will continue to ripen in the field once pulled and will become viable.

Hypothesis 2: Sahara mustard seeds remain viable after host plant is sprayed with herbicide during the early fruiting stage while fruits are still immature.

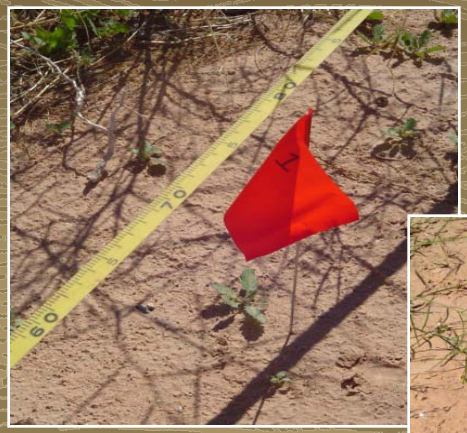
Hypothesis 3: There is genetic variation between small and large Sahara mustard plants.

Hypothesis 4: Sahara mustard seed germination is inhibited by light.

Hypothesis 5: Sahara mustard is not capable of self-fertilization.

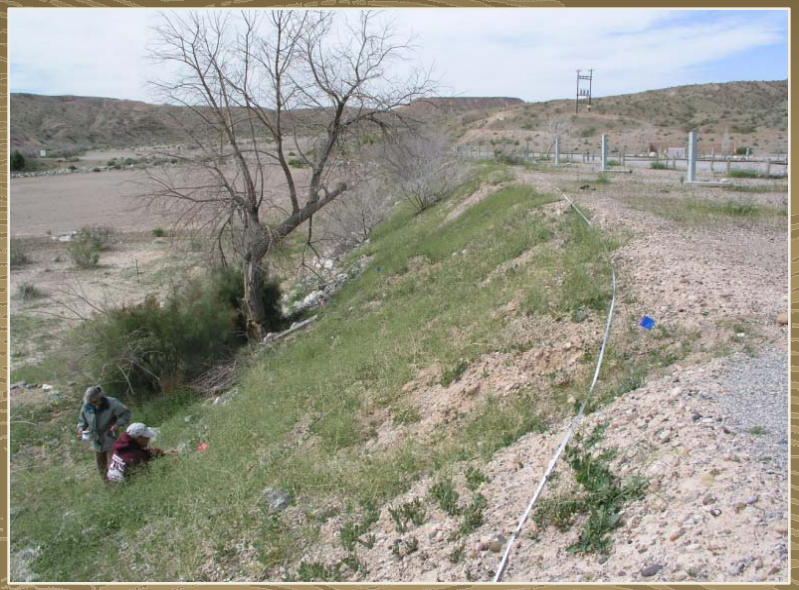
Hypothesis 6: Sahara mustard seeds are short-lived in the soil seed bank.

Hypothesis 1: Sahara mustard seed development



- Study area heavily infested, located at Box Car Cove, Lake Mead NRA
- 100 Sahara mustard plants were selected
- Plants were labeled using pin flags; plant and silique growth monitored through time
- Treatments (pull, break, silique removal, and control) were assigned randomly
- Siliques were collected approx. two weeks after treatment application
- Germination tests are being conducted

Hypothesis 2: Sahara mustard sprayed with herbicide



Crew identifying developmental stages of seed pods on each plant

- 60 seed pods selected from 3 developmental stages for each plot
- 3 herbicide plots (Glyphosate, Metsulfuron methyl, and 2,4-D) and 1 control plot
- Seed pods were collected after die off had occurred
- Separation of seeds from seed pods and germination of seeds is in progress

Fence was placed around the perimeter of the site to keep animals from disturbing and grazing on the plants

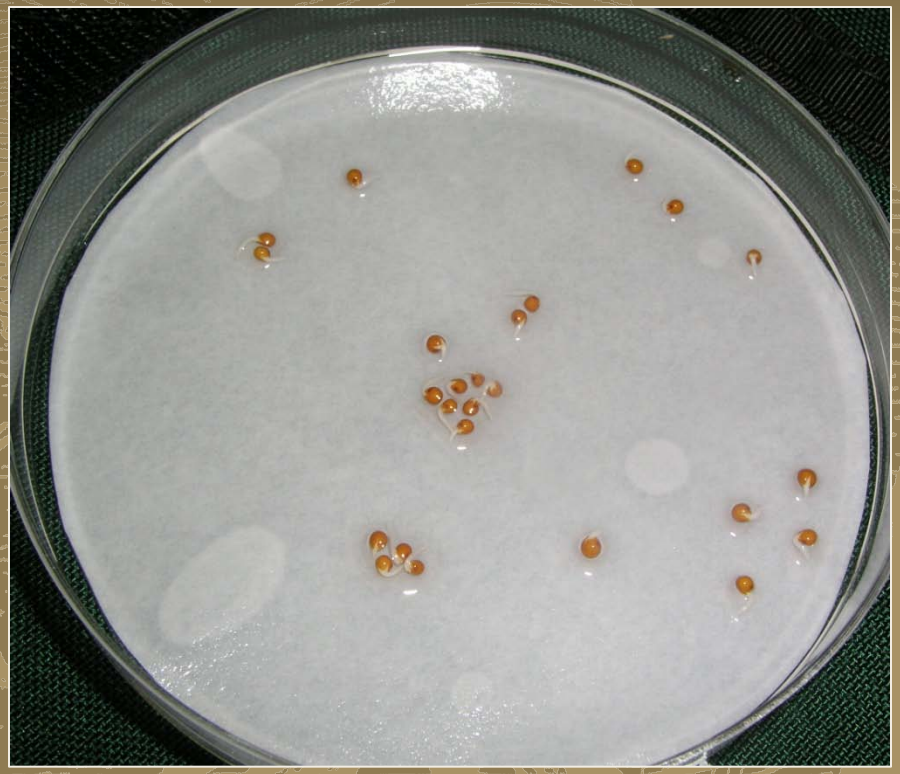
Hypothesis 3: Genetic variation of Sahara mustard

- The site is located off of Lakeshore Drive in an area that the public will not disturb the plants.

- Timing was too late to start this experiment. The rosettes of the plants had already started to die off. This would not of given accurate results when collecting rosette measurements.

- Start experiment when the plants come back up this winter/spring 2011.

Hypothesis 4: Sahara mustard seeds inhibited by light



Raw Data

Treatment	2 year old seeds	1 year old seeds
15 C /9 C Dark	199	216
20 C /12 C Dark	220	223
25 C /15 C Dark	222	225
15 C /9 C Light Dark	0	0
20 C /12 C Light Dark	2	1
25 C /15 C Light Dark	22	30

The table represents the number of seeds that germinated within a 9 day period. The total possible that could germinate per treatment and year was 225. The photoperiod was 12 hours. Statistical analysis will be conducted on the data.

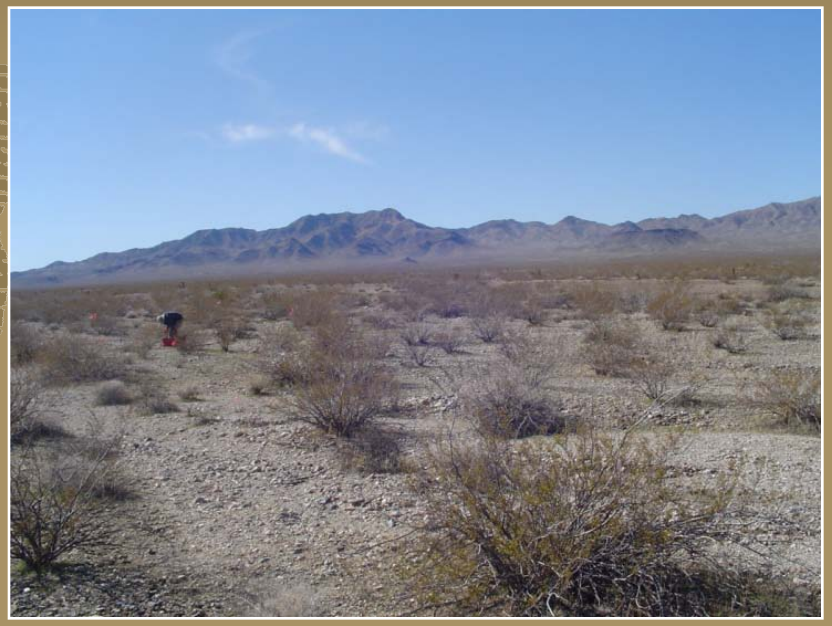
Hypothesis 5: Self-fertilization of Sahara mustard

- This experiment has been unsuccessful, three attempts have been made

- Seedlings develop to the cotyledon stage and then wither away, probably from damping off disease

- We will try adding more sand to the soil mixture and changing the water regime

Hypothesis 6: Sahara mustard seed burial



First seed retrieval begins this month.

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