

ASTRAGALUS OXYPHYSUS* A. GRAY*COMMON NAME: MT. DIABLO MILKVETCH****FAMILY: FABACEAE****GROWTH FORM: PERENNIAL HERB****PLANTING**

Seeds could be planted anytime between October and December. Seeds were hand-sown onto mounded planting beds, and a thin layer of soil was then raked over them. The seeds germinate readily without any form of pre-treatment.

PHENOLOGY

When growing in the San Joaquin Valley, *A. oxyphysus* germinates with winter rains and typically flowers during April and May. June is the peak month for seed collection though in some years, seeds can be collected through July. The species grows rapidly and will potentially produce seeds within one year.

SEED HARVESTING

Fruits are ready for collection when they are light yellow or light brown in color, have a crisp texture, and make a rattling sound when shaken. If the fruits are pliable or have any green color remaining, they are not mature yet. Fruits mature continuously over a period of several weeks, so multiple seed collections are ideal. We would strip fruits from plants by hand into a collecting bag.

SEED PROCESSING METHODS

For small volumes of plant material, we would break open fruits by hand or with the use of a household blender. In order to prevent damage to the seeds, the blender blade needs to first be coated with a plastic dip (Thomas, 2003). To break open a large quantity of fruits, we have used a hammer mill. Because the *A. oxyphysus* fruits are lightweight, they tend to bounce around inside the hammermill rather than moving through it. We found that this problem could be remedied somewhat by blowing air into the hammermill, using the nozzle of an air compressor. Seeds can then be separated from chaff using a Clipper Office Tester (A.T. Ferrell Company), an air separator (SeedTech Systems, LLC.), or wire mesh sieves with various screen sizes.

Seeds per gram = 121¹**CULTIVATION OVERVIEW**

Numerous *A. oxyphysus* individuals derived from two wild source populations have been established in the nursery since 2006, and they have reliably produced seed each year. Some of the individuals were transplanted into the nursery after being started in flats, but the majority of them grew from seed that was hand-broadcast onto raised planting beds. We have observed that *A. oxyphysus* fruits are sometimes harvested by wildlife. We suspect birds because many of the nursery-grown plants are more than three feet tall and therefore, jackrabbits cannot reach the fruits. Deer are not present in the vicinity of the nursery.

Numerous nursery-grown *A. oxyphysus* plants became infected with a rust fungus, *Uromyces punctatus* (identified by Meadowview Labs in Sacramento, CA). The rust is specific to the *Astragalus* genus, and therefore it did not pose a risk to the majority of other species growing at the nursery. The rust is an obligate parasite, so it will not kill its plant host, but it has the potential to reduce plant productivity and seed set. Though the rust is not seed-transmitted, we were advised to treat all *A. oxyphysus* seeds with fungicide before using them in any research or restoration trials.

During several growing seasons, *A. oxyphysus* fruits became heavily infested with an insect identified as *Acanthoscelides* spp. (subfamily Bruchinae). Insects of this genus are commonly referred to as seed weevils, and they infest a variety of leguminous plant hosts. The weevil larvae live in and feed on growing or stored seeds, rendering infested seeds unviable (see photo). Because seeds of *Astragalus* species are contained in pod-shaped fruits, the degree of infestation and seed damage incurred was not apparent until fruits had already been collected and transported to our seed processing facility. We have since learned that small exit holes are visible on the fruits, if one knows to look for them. We attempted to control the insects through a combination of fumigation (with an over the counter flea fogger product), freezing of processed seed lots, and vacuum removal during seed processing. Admittedly, we had some concerns about the effect of freezing on seed germinability. In some instances, we believed that we had successfully eradicated the insects during seed processing, but later observed insects in stored seed lots. Therefore, stored seed lots of *Astragalus* and other legume species should be periodically checked for infestation. In order to minimize seed damage and reduce the amount of effort required for seed processing, it would be ideal to find a way to control the insect infestations in the field.

The Great Basin Native Plant Selection and Increase Project has also reported problems with seed weevil infestations of cultivated *Astragalus* species (nsl.fs.fed.us/Forb_seed_predators.ppt).

A. oxyphysus appears to be well adapted to nursery site conditions but the problems with rust and seed weevils complicated our efforts to cultivate the species for the purpose of seed production.

¹ This figure (n = 5; standard deviation = 3) is derived from a seed lot that was harvested from the native plant nursery in 2008.

REFERENCES

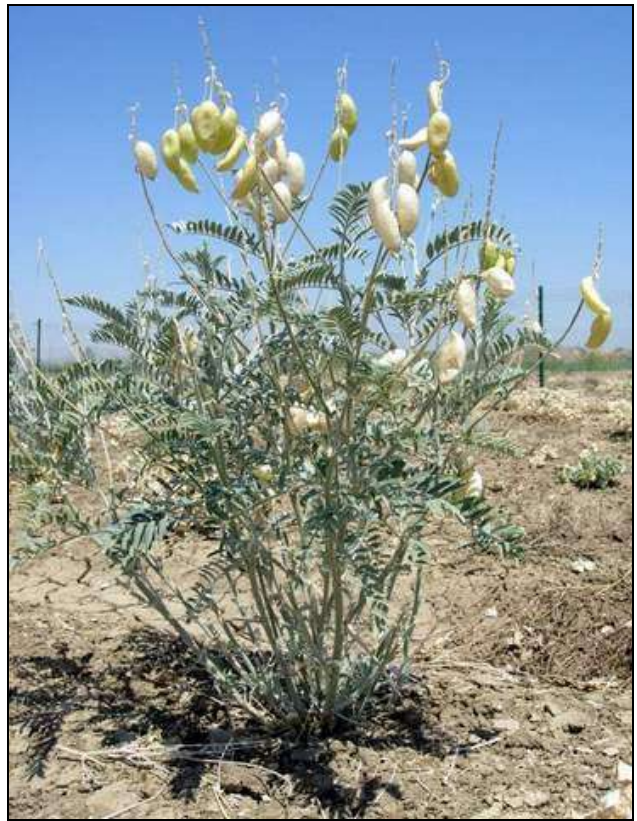
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PHOTOS



While in cultivation at the native plant nursery, *A. oxyphus* plants became infected with a rust fungus, *Uromyces punctatus*.



While in cultivation at the native plant nursery, *A. oxyphysus* seeds became infested by seed weevils. The weevil larvae live in and feed on growing or stored seeds, rendering infested seeds unviable. Scale shown is millimeters.



A. oxyphysus seeds. Scale shown is millimeters.