

Saving a rare Oregon native

Finding the best way to propagate *Astragalus peckii* (aka Peck's milkvetch) is necessary for the plant's survival



A. peckii in full flower. The flowering season for *A. peckii* is from May to July.

By **Tabitha Pearson**

Big mountain sagebrush and bitterbrush stretch for miles over the rich pumice soils of the Tumalo Wildlife Corridor, which sits beneath the snow-coated Three Sisters Range, just a few miles west of Bend, Oregon.

The eruption of Mount Mazama — the present-day Crater Lake — created a fertile soil environment and spurred the evolution of several unique animal and plant species, some of which are endemic and only found at this location on Earth.

One of these species is *Astragalus peckii* Piper, a milkvetch that grows stems about 1–3 decimeters long and 5–8 millimeter-long fruits. Though small

compared to its neighboring plants, *A. peckii* provides valuable ecological services to soil and wildlife habitat.

A. peckii is listed by the Oregon Department of Agriculture as a threatened species, which is defined as any native plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. *A. peckii* is threatened by habitat loss from off-road vehicle use, urbanization and agricultural development.

Conservation management of rare species can include propagation and planting components, but departments need to be advised on the feasibility of creating new populations from seeds

and seedlings in different habitat areas, such as those where the plants are historically absent or in areas of previous disturbance. Additional information about seed germination methods and seedling survival are also needed to make informed and comprehensive conservation management plans.

This study was done by the Oregon Department of Agriculture Native Plant Conservation Program in accordance with an honors undergraduate thesis at Oregon State University. We sought to answer some of the major questions involved in this rare plant's propagation: what sites should seedlings and seedlings be placed in that would best ►



FARWEST

FAR FROM ORDINARY

AUGUST 27-29, 2015

At the Oregon Convention Center

The 2015 Farwest Show is far beyond what you've come to expect from a nursery industry show. At Farwest - the biggest show in the West - you'll find far more to see, make far more connections with industry professionals and new friends, and leave with far more ideas.

Farwest: Far From Ordinary.
www.farwestshow.com

FARWEST
PORTLAND 2015



OREGON
ASSOCIATION OF
NURSERIES

▲ SAVING A RARE OREGON NATIVE

reflect future planting efforts? What is the best methodology for creating seeds and seedlings? What unique problems arise in the cultivation of this species?

The site

Beaver Marsh and Bull Flat, both outside of Bend, Oregon, are the two major sites representing the native range of *A. peckii*.

The seed and seedling plots for the study were placed at Bull Flat. The decision of where to plant the seedlings and seeds was based on degree of disturbance and degree of occupancy of the site. A survey was conducted at Bull Flat to establish transects and plots, and to gather vegetation data including cover and other species present.

Four, 50-meter transects were made in four habitat types: undisturbed and occupied, undisturbed and under-occupied, disturbed and occupied, and disturbed and under-occupied. Disturbed sites had no vegetative cover, and under-occupied sites had less than 10 *A. peckii* present in the 20 quadrats surveyed randomly per transect.

Bull Flat is located in the Tumalo Wildlife Corridor where several other

species are protected, such as mule deer and bobcats. *A. peckii* provides a known habitat for a species of a native moth and may also have nitrogen-fixation properties common to some legumes.

From seeds to seedlings

The seeds of *A. peckii* are produced in a small pod after a flowering season from May to July. The pods typically contain one to two seeds.

For this study, seeds were collected from both the Bull Flat and Beaver Marsh sites, and seeds from previous collections added variables until there were five seed types: seeds collected from Beaver Marsh in 2013 and 2014, and seeds collected from Bull Flat in 2012, 2013 and 2014.

Each of these seeds was given one of three treatments and placed on filter paper in a petri dish in the greenhouse with a thin coat of deionized water. The seeds were placed in batches of 10 with five replications; each batch was either left unscarified, scarified with a scalpel, or scarified with sandpaper. Data was collected after 15 days.

The results of this study suggest seed age and scarification methods are



A researcher takes GIS data of the locations and populations of individual *A. peckii* plants in the sagebrush-juniper woodlands of Bull Flat beneath the Three Sisters.



A 15-day-old seedling is covered with quartz to mimic the dry soil of Bull Flat and to prevent fungal disease.

significantly different for some treatments, but that site location does not significantly affect the germination rate. Seeds from both sites for years 2012 and 2013 required scarification to break the seed coat and allow water to imbibe the seed for germination.

The scalpel and sandpaper treatments worked equally well; both were performed for each of the seeds under a microscope to improve treatment quality and prevent damage to the embryo.

Seeds untreated from 2014 did not have significantly different germination rate than those seeds that were scarified. This suggests seeds have increasing physical dormancy over time and should therefore be treated if seeds from older stores are used for restoration. Fresh seeds can be left untreated.

Of the seeds that germinated, 300 were placed in the OSU greenhouse in a randomized scheme in one of three

SCOOP UP SPRING SAVINGS



KX040

- 42.4 HP Common Rail System Engine Provides High Torque
- ECO PLUS Mode for up to 9% Fuel Savings
- Spacious Cab with Deluxe Seat and Plenty of Legroom
- New User-Friendly Digital Panel

**\$0 DOWN, 0% A.P.R. FINANCING FOR UP TO
60 MONTHS ON SELECT NEW KUBOTAS!***



* \$0 Down, 0% A.P.R. for 60 months on new Kubota BX, B/B26, L (excluding L39 & L45) and M Series (excluding M59, M Narrow, M96S, M108S and M9960HDL models) K008, KX, U, R, SVL75-2, RB, DMC, DM, RA & TE Series Equipment is available to qualified purchasers from participating dealers' in-stock inventory through 6/30/2015. Example: A 60-month monthly installment repayment term at 0% A.P.R. requires 60 payments of \$16.67 per \$1,000 financed. 0% A.P.R. interest is available to customers if no dealer documentation preparation fee is charged. Dealer charge for document preparation fee shall be in accordance with state laws. Inclusion of ineligible equipment may result in a higher blended A.P.R. Not available for Rental, National Accounts or Governmental customers. 0% A.P.R. and low rate financing may not be available with customer instant rebate offers. Financing is available through Kubota Credit Corporation, U.S.A., 3401 Del Amo Blvd., Torrance, CA 90503; subject to credit approval. Some exceptions apply. Offer expires 6/30/2015. See us for details on these and other low-rate options or go to www.kubota.com for more information. K1217-21-121284-2



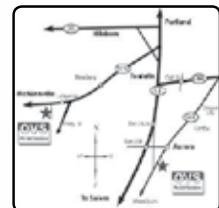
OVS MCMINNVILLE OVS AURORA
2700 ST. JOSEPH RD. 19658 HWY. 99 E.
MCMINNVILLE, OR HUBBARD, OR
(503) 435-2700 (971) 216-0111

WWW.OVS.COM

800-653-2216

STORE HOURS:

Mon-Fri: 8am-5pm • Sat: 8am-Noon



**100% Employee
Owned and Operated!**



The seeds of *A. peckii* are small and must be scarified manually under a microscope to prevent damage to the embryo.

Metro-Mix potting soil mixtures: full potting soil, potting soil with one cup of native soil, and potting soil with two tablespoons of native soil. Band pots were chosen because they are deep and promote strong taproot growth, an important feature of native *A. peckii*. The pots were lined with fiberglass mesh to prevent soil loss.

An additional 100 seedlings were placed in pure potting soil for the fall 2014 planting, and 25 seedlings were placed outside to assess growth differences in the greenhouse. Seedlings

showed a 30–65 percent mortality rate unrelated to soil treatment type.

After 13 days, quartz was added to the top of the soil in response to concerns of damping off and to mimic the dry conditions of Bull Flat. Several seedling samples were sent to the Oregon State University Plant Pathology lab, and no pathological cause for the mortality was found.

Plant mortality could be caused by anything from genetics to an unfavorable environment in the greenhouse. The 25 seedlings placed outside faced similar mortality but had a greater amount of

branching and were stouter than the seedlings grown in the greenhouse, which were taller but less dense. For the planting, three of the seedlings grown in the greenhouse were planted per plot with one seedling grown outside.

Planting

On November 8, 2014, 160 plants were placed in the four habitat types in Bull Flat with 12,800 seeds planted ½ centimeter deep in undisturbed areas and arranged in 640 seeds per packet from all years and sites to encourage germination success. Volunteers from the Friends of the Tumalo Wildlife Corridor were vital to the timely completion of the project and assisted with planting seeds and seedlings.

A. peckii are persistent perennials that go dormant in winter, so the goal is to spot the adult plants and new germinated seeds in the spring. We will return to the site in the spring to assess survival rates of the seedlings and to do a survey of the population. Further research will reveal the likelihood of restoring this plant to undisturbed and disturbed sites from seeds and seedlings. ☺

Tabitha Pearson is a botany student working on A. peckii restoration for her undergraduate thesis in the University Honors College at Oregon State University. She can be reached at pearsota@onid.oregonstate.edu.

<p>AQUATIC BIOTICS <i>Biological Pond, Lake & Fountain Treatment</i></p> <p>All Natural Biologic for Healthy, Clear, Pond Water... SAFE TO FISH, PLANTS & OTHER AQUATIC LIFE!</p> <p>100% ALL NATURAL! Contains ... Bio-plex™ Cultured Beneficial Bacteria & Enzymes. 100% Safe & Effective.</p> <p>BENEFITS: Improve & Maintain Water Clarity & Quality • Promotes Healthier Fish, Plants & Other Aquatic Life • Effectively Breaks Down & Prevents Dead Algae, Organic Sludge, Scum, Sediment, Leaves & Much More • Eliminates & Prevents Noxious Odors From Algae, Fish Food, Excrement & Nutrient Build-Up • Promotes Superior System Filtration Functions.</p>	<p>TRANSPLANT CONCENTRATE PLANT ENHANCER</p> <p>REDUCES PLANT MORTALITY</p> <p>Use... (1) Where Plant Decline or Failure is NOT an Option! (2) To Successfully SUMMER-DIG, INSTALL, or MAINTAIN Ornamentals under Hot, Harsh, Severe & Adverse Conditions.</p> <p>Concentrated Bio-Stimulant Root Drench... Seakelp-Humic-Vitamin & Enzyme Complex</p> <ol style="list-style-type: none"> 1. Reduces stress symptoms 2. Greatly improves moisture retention 3. Speeds fibrous root mass formation 4. Critical for Successful "Summer Digging" 5. Rehabilitate declining plants 6. Helps plants survive hot, dry conditions <p>RELIABLE, EFFECTIVE, INEXPENSIVE PLANT SURVIVAL INSURANCE! "Using Bio-Plex with our plantings has reduced our need to replace plants by 90%. In one instance Bio-Plex made us \$10,000!" -Legend Landscaping</p>	<p>TREE RING™ Makes every drop of water count!</p> <p>Regular Size 25 gallons Junior Size 10 Gallons</p> <p>Compact... Nest for easy storage.</p> <p>PLUMLEE NURSERY PRODUCTS</p> <p>www.plumleeacres.com Forest Grove, OR 503.359.5998 info@plumleeacres.com Available at: Marion Ag</p>
<p>NATURAL PEST SOLUTIONS</p> <p>Are Repellent Failures Frustrating You? DON'T GIVE UP</p> <p>Keep deer, rabbits, moles, voles, insects and woodchucks away from plants!</p> <p>YES! REPELLENTS That Really Work! Natural Pest Solutions 1 GALLON CONCENTRATE BOTTLE & 48 OZ. RTU BOTTLES</p> <ul style="list-style-type: none"> • Woodchuck & Rodent Solution • Deer Solution • Tick & Flea Solution • Mosquito Solution • Plant Solutions 		