3000 ppm IBA rooting powder. Cuttings were struck with at least 2 nodes below the surface of rooting medium (1:1 v:v perlite:sand) in an outdoor mistbed with bottom heat maintained at 22 °C [72 °F]. All cuttings rooted in 8 wk and were potted into 3-l (1-gal) containers containing the same medium, Osmocote, and Micromax fertilizer described above, but at the rate of 4 g (0.14 oz) of Osmocote and 2 g of Micromax per container. Cuttings are grown in the shade house for the remainder of the growing season. Cuttings produce firm root systems in 1 to 1.5 y (Hosokawa and others 2001).

REFERENCES

Baskin CC, Baskin JM. 1998. Seeds: ecology, biogeography, and evolution of dormancy and germination. San Diego (CA): Academic Press. 666 p.

Hitchcock CL, Cronquist A. 1996. Flora of the Pacific Northwest—an illustrated manual. Seattle (WA): University of Washington Press. 730 p.

Hosokawa J, Wick D, Luna T. 2001. Propagation protocol for vegetative production of container *Oplopanax horridus* Miq. plants (3 L containers); Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 3 Jan 2001). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

Ianson D. 2000. Personal communication. Palmer (AK): Curator, National Arctic Plant Germplasm Unit, Alaska Plant Materials Center.

[ITIS] Integrated Taxonomic Information System. 2000. Biological names. Version 4.0 (on-line database). URL: http://www.itis.usda.gov/plant-proj/itis/itis_query.html (accessed 29 Dec 2000).

Kruckeberg A. 1989. Gardening with native plants of the Pacific Northwest. Seattle (WA): University of Washington Press. 252 p.

Marles R, Clavelle C, Monteleone L, Tays N, Burns D. 1999. Aboriginal plant use in Canada's northwest boreal forest. Vancouver (BC): University of British Columbia Press. 368 p.

Marles R, Farnsworth N. 1995. Antidiabetic plants and their active constituents. Phytomedicine 2:137–189.

Moerman D.1998. Native American ethnobotany. Portland (OR): Timber Press Inc. 927 p.

Turner N. 1998. Plant technology of first peoples in British Columbia. Vancouver (BC): University of British Columbia Press. Royal British Columbia Museum Handbook. 256 p.

[USDA] USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. 2001. Fire Effects Information System [Online]. URL: http://www.fs.fed.us/database/feis/plants/shrub/oplhor/ (accessed 3 Jan 2001).

Wick D, Luna T, Evans J, Hosokawa J. 2001. Propagation protocol for production of container *Oplopanax horridus* Miq. plants (490 ml containers); Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 3 Jan 2001). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

AUTHOR INFORMATION

Tara Luna
PO Box 447
East Glacier, MT 59434
tluna@3rivers.net

*Propagation Protocol for Poison Oak (*Toxicodendron diversilobum*)*

MIKE EVANS

KEY WORDS: Anacardiaceae, seed germination, vegetative propagation, revegetation

NOMENCLATURE: USDA NRCS (1999)

"Why in the world would anyone grow THAT?" is the most common question we hear when someone walks by a healthy crop of poison oak (*Toxicodendron diversilobum* (Torr. & Gray) Greene [Anacardiaceae]) in containers at our nursery. Hopefully, they didn't step too close as to have brushed against the plants. If they were wearing shorts on a summer day, they might leave Tree of Life Nursery in good shape, but in a couple days they would remember us with an irritating rash on their legs, and their itch might last more than a week.

Poison oak is an important member of many plant communities in the west from Baja California to British Colum-

Photo by Thomas D Landis

Poison oak (Toxicodendron diversilobum)

bia. Tree of Life Nursery is a wholesale grower of California native plants for use in ecological restoration and authentic landscapes. So that explains what it is and why we grow it. Poison oak provides valuable habitat for wildlife; cover, nesting materials, and edible berries for the birds. It is an significant component of coastal sage scrub, chaparral, oak woodland, and mixed evergreen forest, usually growing near water or in moist canyon bottoms. Its wide range makes it a well known plant in California—notorious with campers and hikers who try to avoid brushing up against it.

To avoid skin contact, we wear special protective gear when we handle this species in propagation. Seeds can be collected in late summer (the worst time to be near the plant—the leaves are blistering with toxic oils) and the fresh fruit can be stored and handled as dried berries in the fall. Even seeds and berries must be handled with caution because all parts of the plant can cause skin irritation. To simulate digestion by bird species, we scarify seeds by soaking the dried berries in sulphuric acid for 3.5 h. The fruit will disintegrate and the seed coat will be affected to allow more rapid, even germination. After the acid soak, we thoroughly rinse the seed until no trace of acid remains by slowly running fresh water through the seeds all night. Seeds are ready for sowing the next day. We generally like to sow seeds immediately after collection into nursery flats containing a coarse seed germination mix (1:1:1:1 [volume basis] perlite, vermiculite, coarse sand, and sphagnum peat moss). Sown flats are placed into a shadehouse and seeds are allowed to germinate during fall, winter, and spring. Winter temperatures at our nursery range from 0 to 13 °C (32 to 55 °F). Most germination occurs during fall and spring when soils are warmer. We keep the flats moist during the germination period. Germination can occur in about 3 wk. Seedlings are ready for transplanting into small containers about 2 mo later (see below).

Poison oak is easy to grow from cuttings but we take extreme precautions (Figure 1). By cutting into the stem and exposing the sap, there is a high probability the propagator will get a case of "poison oak" unless they wear protective gear, including a respirator on hot days. If inhaled for a prolonged period, the volatile oils can affect the sensitive areas of the mouth, throat, and lungs. Most firefighters in the west are familiar with the dangers in breathing the smoke of burning poison oak.

With extreme care, we take softwood or semi-hardwood cuttings throughout the year. Of course, the most "convenient" time to do this would be the dormant winter season when the plants are leafless, but handling the stems can still result in skin irritation. The most successful stem cuttings are about 5 cm (2 in) long and 3 to 9 mm (0.125 to 0.375 in) in caliper. If cuttings are taken during the active growing season, we remove or trim leaves to reduce transpiration during the rooting period. We stick the cuttings with 1 or 2 nodes in the coarse rooting medium (3:3:3:1 [volume basis] course sand, perlite, vermiculite, and sphagnum peat moss). Cutting flats are placed in a humid, cool, greenhouse environment. We experience relatively high humidity levels being only 16 km (10 miles) from the Pacific Ocean so periodic sprinkling (a few times each day depending on weather) of the cuttings is sufficient. Too much misting results in stem rot. Roots form in 4 to 6 wk and the rooted cuttings can be transplanted into small pots.

Both our 2-mo-old seedlings and 4- to 6-wk-old rooted cuttings are transplanted into small containers. We use either 250 ml (2.25 in wide X 3 in deep) or 1050 ml (4 in) containers filled with a 4:1 organic:inorganic (v:v) medium. The organic component is a 1:2 (v:v) mixture of bark:wood shavings and sawdust. The wood components include redwood (*Sequoia sempervirens* (Lamb. ex D. Don) Endl. [Taxodiaceae]), ponderosa pine (*Pinus ponderosa* P. & C. Lawson var. *ponderosa* [Pinaceae]), and white fir (*Abies concolor* (Gord. & Glend.) Lindl. ex. Hildebr. [Pinaceae]). The inorganic component is coarse sand. We also add Osmocote 18N:6P_2O_5:12K_2O (9 mo release rate at 21 °C (70 °F) at a rate of about 2.7 kg/m^3 (4.5 lb/yd^3) and inoculum of the vesicular arbuscular mycorrhiza *Glomus intraradices* via Grolife (Gro-Power, Chino, California) at a rate of 6 kg/m^3 (10 lb/yd^3). Plants generally stay in these containers a couple of months before being transplanted up to 3-l (1-gal) containers that are filled with the same medium and fertilizer. Poison oak in nursery containers prefers light shade and plenty of water. It is a rapid grower and we have saleable plants in 6 to 9 mo.

Photo by Mike Evans

Figure 1 • Protective gear must be worn when taking poison oak cuttings.

Certainly poison oak is not an appropriate choice for any use other than wildlife habitat in ecological restoration projects. However, if it is omitted at a revegetation jobsite within its native range, an essential component of the plant community will be missing. Native plant nurseries can play an important role by producing all the key plant species needed for habitat restoration. . . even those we consider "less desirable" from our human perspective.

REFERENCE

USDA NRCS. 1999. The PLANTS database, Version 3.0. URL: http://plants.usda.gov/plants (accessed 7 May 2001). Baton Rouge (LA): National Plant Data Center.

AUTHOR INFORMATION

Mike Evans
Tree of Life Nursery
PO Box 635
San Juan Capistrano, CA 92693
mikevans@flash.net