Pick your battles

Eliminating weedy cottonwood is a fight worth taking on

Cottonwoods, also known as poplars, are regionally abundant native trees that can become weedy in container and field nurseries. Management considerations for controlling this species are time-sensitive. Take notes now and prepare for action over the next few months. This article will discuss the biology and control of cottonwoods in container nurseries. Two references that were used to write this article and that are recommended for further reading on the biology and ecology of cottonwoods in Oregon can be found at the end of this article.

Black cottonwood *(Populus trichocarpa)* is the cottonwood species native throughout Oregon, Washington and the western half of British Columbia. Other common cottonwood species native to other regions of North America include balsam cottonwood *(P. balsamifera),* eastern cottonwood *(P. deltoides),* Fremont cottonwood *(P. fremontii)* and narrow-leaf cottonwood *(P. angustifolia).* Cottonwoods hybridize readily. Due to breeding efforts in and around the Willamette Valley of Oregon, one cannot preclude the possibility that some local populations are different from the native *P. trichocarpa.* Nonetheless, for the sake of clarity and succinctness, we will assume that the species of interest to Oregon nursery growers is the native black cottonwood *(P. trichocarpa),* and we will focus the remainder of our discussion on that species.

Some references, texts and Web sites may use *P. balsamifera* ssp. *trichocarpa* as the scientific name for black cottonwood. The most commonly agreed upon name is the one we will use, *P. trichocarpa.*

Reproduction

Many battles in the war on weeds can be won by understanding and then undermining a weed's ability to reproduce. This is particularly true for black cottonwood, which can

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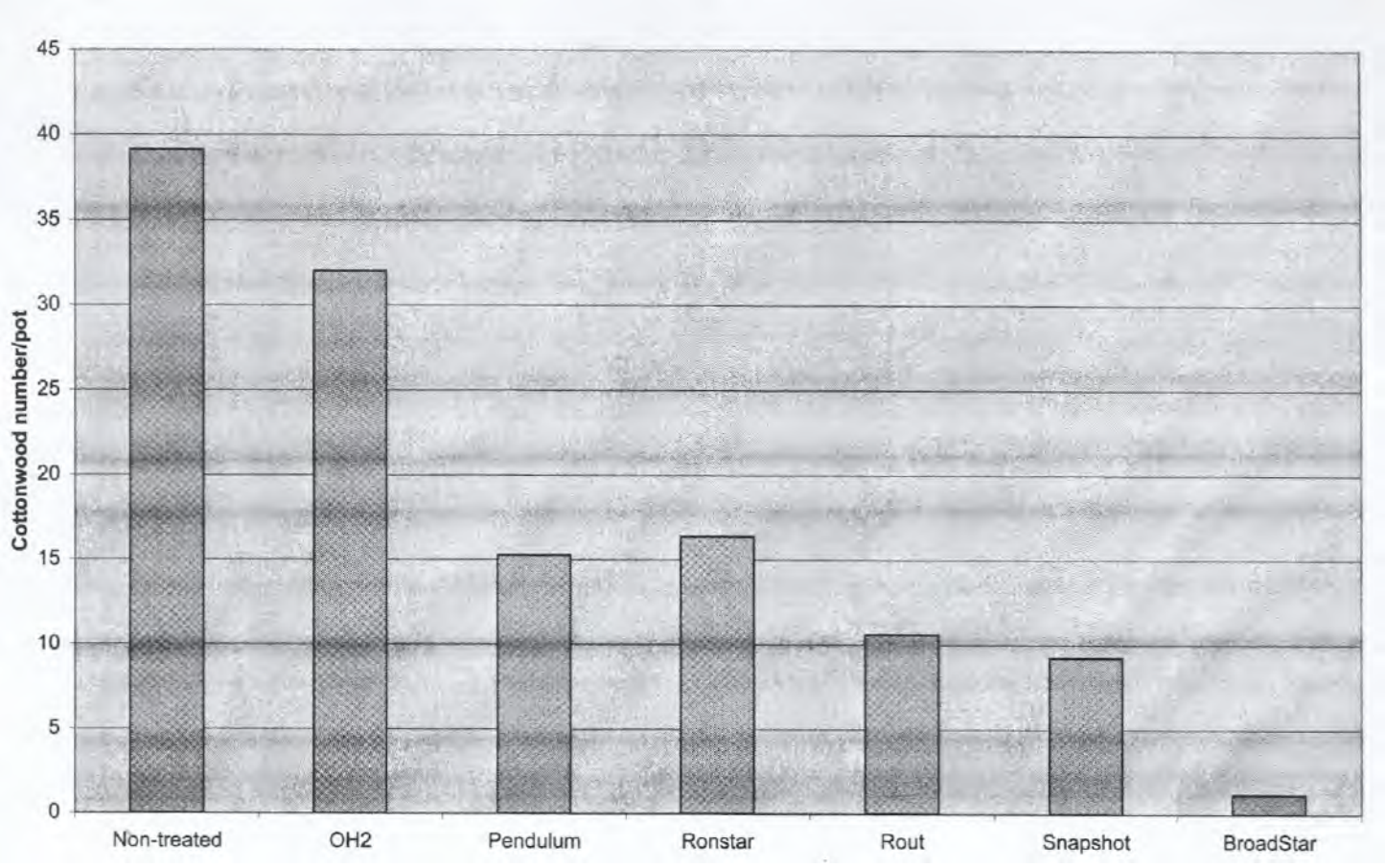
reproduce vegetatively or sexually. Vegetative reproduction occurs by stem and root sprouting. This has profound consequences in natural ecosystems but is of little consequence in a container nursery. It is virtually impossible, or at least highly improbable, that established cottonwoods in the local area would spread vegetatively into a container or container nursery.

Spread of seed from mature cottonwood trees into nursery containers is the primary problem nursery growers must manage. Black cottonwood is a *dioecious* species, with male and female flowers occurring on separate plants. Black cottonwood trees disseminate their seeds from mid-May to early June in the Portland-Salem area of Oregon. Seeds of cottonwood are wind-disseminated via a white, cottonlike appendage on the seed (hence the name). Seed release from a tree or group of trees is noticeable and obvious with the large masses of cottonlike seed floating through the air.

Upon release, seeds of cottonwood must land in a suitable environment for germination or die. Viability of cottonwood seeds is high for about two weeks, after which seeds lose all viability. Disturbed soil with no competing vegetation, coupled with abundant light and available water, is necessary for germination and establishment. In natural ecosystems, riparian areas along streams, rivers and lakes are ideal. Container crops are often conducive sites for germination, due to their exposed substrate surfaces (high light) and exposure to frequent irrigation or abundant rainfall (in the spring). If a seed lands in a suitable site (e.g., container crops) germination occurs in eight to 24 hours.

The key to cottonwood reproduction is that seeds are released in a very narrow window of time, and seeds remain viable for a very short time after release. Mid-May to early June is the critical time period for preventing establishment of this species in containers.

Cottonwood numbers in herbicide-treated containers.



Nonchemical control options

Coarse mulches such as coco-fiber disks, geotextile disks, hazelnut shells and many other like products should be effective in preventing cottonwood germination. The key criteria for using mulches is to choose those that will dry quickly after irrigation or precipitation. Cottonwoods require abundant soil moisture to germinate and survive. Coarse mulches that dry quickly should prevent successful germination.

Shielding crops from blowing seed is another possibility for control, albeit one with limited applicability in most nursery operations. Closing the sidewalls and roofs of a retractable-roof greenhouse is one way to shield crops from seed flow during periods of peak seed release. This would only have to be done for a two- or three-week period in May-June. Crops not within a structure could be covered with semipermeable materials such as shade cloth.

Chainsaws provide effective cottonwood control. Remove female trees from the surrounding area (assuming you own the land). Seed can travel great distances, so there's no guarantee that removal of local trees will completely eliminate the seed source. However, I've visited many large nurseries with cottonwood infestations in their containers. Many of these nurseries have localized areas within the nursery with severe infestations, and these are most always in close proximity to a mature stand of cottonwood trees. Removing trees (females only) within eyesight of the nursery crop should eliminate most of the problem. I suspect that the only way to distinguish male from female trees is to observe their flowers or fruit.

If you intend to remove cottonwoods from the local area, consider replacing those trees with new plantings. A wealth of literature documents the beneficial aspects of cottonwoods on stream health. Cottonwoods purify water from agricultural lands, stabilize soil and stream banks and serve as habitat for amphibians, birds and mammals. My recommendation for removing female trees is intended to improve weed management without the use of additional herbicides; however, be careful not to impair the local ecosystem in an effort to reduce a weed nuisance in the nursery.

Herbicidal control

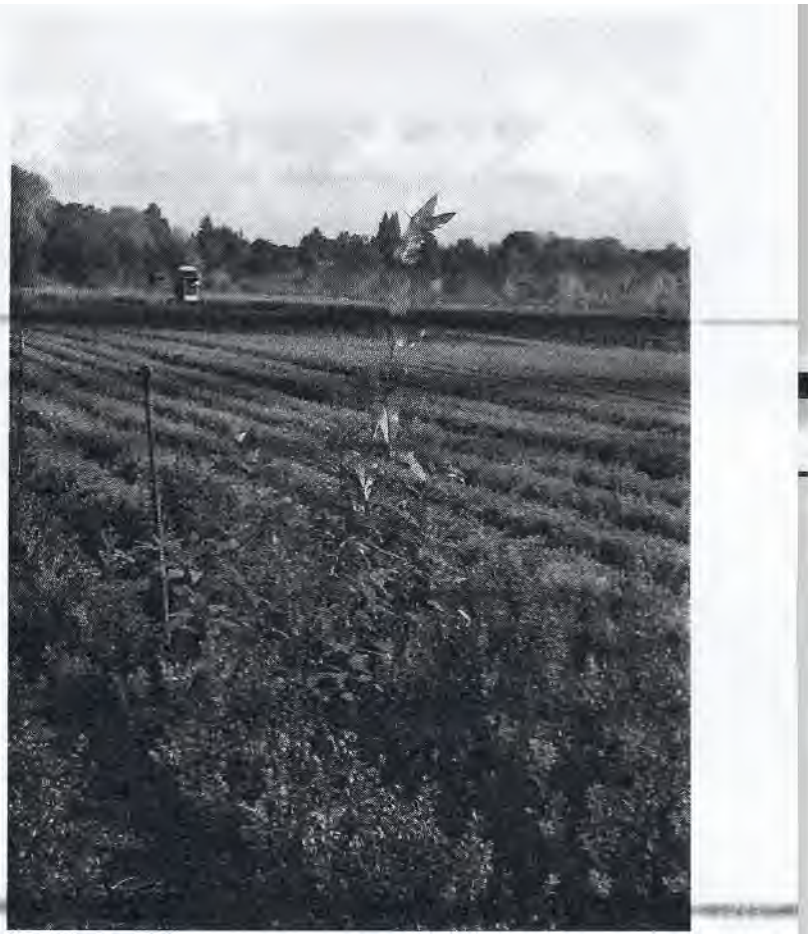
We conducted an experiment at the Oregon State University North Willamette Research and Extension Center to determine which of the commonly used pre-emergent herbicides was most effective in preventing cottonwood establishment in containers. On May 5, 2006, we filled containers with Douglas fir hark amended with a common fertilizer mix. Two days after potting, containers were treated with one of seven herbicide treatments (Figure 1, Page 36). Containers were set beneath a large black cottonwood tree for three days to collect free-falling seed. Containers were then returned to our gravel container production yard where they received overhead irrigation as needed. Approximately 80 seeds had landed in each container. Cottonwood numbers in each pot were counted two months after herbicide application and are presented in Figure 1.

BroadStar provided the most effective cottonwood control, although control with Snapshot, Rout and Pendulum was also effective. These herbicides were applied just days prior to seeding. This sort of application would be ideal in a nursery setting. However, many nurseries apply pre-emergent herbicides in February or March, with a second application possibly in June or July. Assuming only one application is made prior to cottonwood seed release, and assuming that application is made as early as February or March, much lower levels of control should be expected, even when using BroadStar.

Pre-emergent herbicides form a chemical barrier over the substrate surface (see *Digger*, May 2002). As weeds germinate and grow through the chemical barrier, they are either stunted or killed. Many labels for pre-emergent herbicides indicate the product should be reapplied every 75 to 90 days. This is somewhat misleading, in that it implies the product provides effective control for 90 days, then stops working. Herbicides are degraded in nature (and container substrates) at fairly constant rates. More important, herbicides begin degrading almost immediately after they are applied. In other words, the chemical harrier on the substrate surface is strongest immediately after herbicide application and becomes progressively weaker over time (see

Cottonwoods have infested and overwhelmed these 1-gal *Hydrangea* plants.

Mature fruit of a female cottonwood tree gets set to release airborne seeds.



Cottonwood is a large and aggressive weed of nursery crops.

Digger, April 2004). Application of an herbicide for the control of a specific weed species should occur prior to, but as close as possible to, the peak emergence date of that weed.

If cottonwoods are problematic in your nursery, use one of the herbicides shown to be effective in this trial. Make applications of this herbicide in early May so that the chemical barrier created by the herbicide in near full strength at the time when cottonwood seed pressure is greatest. If this timing does not fit in with your typical herbicide program, target applications at least to those areas most prone to cottonwood infestation.

Summary

Although black cottonwood is a native tree and plays an important role in local riparian ecosystems, it can be a weedy nuisance in container nurseries. If prudent, remove female trees from the surrounding area to reduce seed pressure in the nursery. Use a proven-effective pre-emergent herbicide, applied in early May, to prevent germination. Remove escape seedlings promptly to prevent stunting of the crop. Some willows *(Salix* sp.) can also be weedy in container nurseries. We are currently working with local nurseries to accurately identify and develop management practices for weedy willows. Look for that information in a future article.

References

- Borman, M. and L. Larson. 2002. *Cottonwood: Establishment, survival, and stand characteristics.* Oregon State Univ. Ext. Pub. EM 8800.
- U.S. Environmental Protection Agency. 1999. *Biological Aspects of Hybrid Poplar Cultivation on Floodplains in Western North America — A Review.* (EPA Document No. 910-R-99-002).

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