



## VEGETATION MANAGEMENT GUIDELINE

White Poplar (*Populus alba* L.)

### SPECIES CHARACTER

#### DESCRIPTION

White poplar can grow to 70 feet (21 meters) or more in height and 2 feet (60 cm) in diameter. The bark is smooth, greenish-white on young trees, becoming dark and rough on older trees. Young green or brown twigs and terminal buds are densely woolly. The pith of the stem, when viewed in cross section, resembles a five-pointed star. The leaves are 2 to 5 inches (5 to 12 cm) long, dark green above, white-woolly beneath and borne on round stalks. Leaves appearing on smaller stems are usually oval; leaves on larger stems tend to be maple-like, palmately 3-7 lobed and irregularly dentate. White poplar is dioecious with staminate and pistillate flowers borne in catkins on different trees. Flowering, if it occurs, is prior to leaf development, usually March or April. The fruits are 0.2 to 0.3 inch (5 to 7 mm) long and dark brown in color. The seeds have minute, silky hairs arranged in a cottony tuft that aids in wind dispersal. Seed producing trees seem to be rare in Illinois with reproduction occurring vegetatively by root sprouts.

#### DISTRIBUTION

White poplar is native to central and southern Europe, North Africa and western and central Asia. It was introduced in the United States in 1784 as a shade and ornamental tree. It is found throughout the continental United States except Washington, Colorado, and Arizona and is scattered throughout most of Illinois. White poplar can form large clonal communities that are capable of excluding native species and degrading natural areas.

#### SIMILAR SPECIES

Big-tooth aspen (*Populus grandidentata*) has grayish-green bark when young and shallow fissures when older. The leaves are nearly circular in shape, up to 5 inches in length, nearly as broad as long with several coarse teeth along the margin and have a flat stalk. Eastern cottonwood (*Populus deltoides*) has smooth gray bark when young, becoming deeply furrowed as the trees ages. The leaves are up to 5 inches long, nearly triangular in shape, smooth and shiny on the upper surface and have a flat stalk. Quaking aspen (*Populus tremuloides*) has pale green or white bark that becomes grayish as it ages. The leaves are up to 4 inches long, green, smooth and shiny on the upper surface with many small regular teeth along the margin and a flat stalk. Swamp cottonwood (*Populus heterophylla*) has smooth gray or brown bark when young, becoming ridged at maturity. The pith is 5-angled. The leaves are large, up to 8 inches long, and 6 inches wide, green on the upper surface, white woolly on the lower surface when young, and have a round petiole. As its name implies, swamp cottonwood grows in swamps and wet forests. It occurs in the



southern one-third of Illinois and the upper Wabash River basin. White poplar should be accurately identified before attempting any control measures. If identification of the species is in doubt, the plant's identity should be confirmed by a knowledgeable individual and/or by consulting plant identification manuals or keys.

#### HABITAT

White poplar can be found in abandoned homesteads and open sunny habitats including meadows, wetlands, riparian zones, roadsides and pastures. It will grow in most soil types and can tolerate a range pH conditions, salt levels, and drought. White poplar grows best in full sun, but can survive in partial shade.

#### LIFE HISTORY

White poplar is a rapidly growing tree with rather brittle wood. Some European countries taken advantage of its growth and vegetative reproductive potential and use it in reforestation along rivers and in large-scale, short-rotation forestry systems that produce biofuels, pulpwood for oriented strand board (OSB) and saw logs for furniture and pallets. Production rates can be as high as nine kiln-dried tons/ha/year. In commercial forestry systems, white poplar requires careful tending following planting and after every coppicing because weed competition reduces productivity.

A single white poplar tree can produce thousands of seeds. The seeds are wind-dispersed and can travel over long distances. Most poplar species can readily hybridize whenever compatible species come in close proximity and a large-scale poplar hybridization project was begun in the U.S. in 1925.

In Illinois, white poplar appears to reproduce primarily by vegetative means as most colonies can be traced back to a planted tree. Suckers arise from adventitious buds produced on the extensive lateral root system. Profuse suckers from the parent plant will form large vegetative colonies. The vegetative colonies (clones) form dense groves. Suckering will occur naturally but can be enhanced by death, injury or disease of the parent plant or the suckers.

Additionally, an unknown number of hybrids have developed in the U.S. and Canada between native species and introduced cultivars, clones, and species. *P. x roulwauiana* is a hybrid between *P. alba* and *P. grandidentata*, *P. x canescens* is a hybrid between *P. alba* and *P. tremula* and *P. x heimbürgeri* is a hybrid between *P. alba* and *P. tremuloides*.

Glyphosate-tolerant strains of white poplar and poplar hybrids have been developed for commercial applications. Glyphosate-tolerant hybrids include *Populus trichocarpa* x *Populus deltoides*, *Populus tremula* x *Populus alba*, *Populus tremula* x *Populus tremuloides* and *Populus alba* x *Populus grandidentata*. White poplar has been considered for biomonitoring because of its ability to accumulate heavy metals, particularly arsenic, lead and cadmium.

#### EFFECTS UPON NATURAL AREAS

White poplar is an aggressive species that can dominate portions of natural areas, especially prairie communities, shading out native vegetation. It easily escapes cultivation and, if left unchecked, it can form dense groves that are difficult to eradicate.

## CONTROL RECOMMENDATIONS

### RECOMMENDED PRACTICES IN HIGH QUALITY NATURAL COMMUNITIES.

Very little research has been conducted on control of white poplar. The control methods listed have been successfully employed for aspen species which are similar to white poplar in growth habits and life history. In most cases, control is achieved through some combination of practices including cutting, girdling, burning, and herbicide application. Small clonal populations are much easier to eradicate than larger ones. White poplar does well in full sun, but, when small, apparently does not compete well against other vegetation. Maintaining the natural character of prairies, fens, and open woodland communities may help to suppress white poplar.

#### Cutting and Girdling

Girdling can be used for control of one, or a few trees, although dense resprouting can occur. For girdling to be effective, use an ax, handsaw, girdler, or chainsaw to make two parallel cuts 4-5 inches apart, cutting through the bark slightly deeper than the cambium. The bark is then either knocked off, using a blunt object like an ax head, or peeled away, using a blunt ax blade. Girdled trees take time to die and the results may not be seen until a year later. When girdled, white poplar produces more suckers than quaking aspen or cottonwood. The large parent tree and any suckers more than 2 inches dbh (diameter breast height) should be girdled. The phloem should be removed without damaging the xylem. Girdles should be checked after a few weeks to make sure that bark does not develop over the cut area. In conjunction with girdling, all small suckers should be cut.

The response of quaking aspen and bigtooth aspen stands to four different treatments (surface burning before and after spring leaf flush and clear cutting before and after leaf flush) has been studied. Three years after treatment, the pre-flush cut had the greatest stem density, average height, and basal diameter. Both cut treatments had greater stem densities than the burn treatments. The pre-flush cut treatment probably had more stems than the post-flush cut treatment because carbohydrate root reserves were not depleted. Thus, cutting during summer months (June through August) may reduce suckering. Summer cutting affects the plant when its root resources are low and the possibility of adverse weather during the fall and winter may further stress the plant. Cutting twice (June and August) may reduce the amount of nutrient stored as root reserves. Any new suckers should be cut at least once per year for good control. All plants and suckers should be cut each time to stress the plant as much as possible.

Girdling and cutting are labor intensive, can increase the number of suckers, at least initially, and will require several years of follow-up treatment. These points should be carefully considered prior to beginning a control effort. Initiation of cutting and/or girdling without a long-term commitment to the project could result in a larger colony.

#### Prescribed burning

Fire-killed aspen stands regenerate from surviving roots, which are stimulated to produce suckers when apical dominance is removed. It is believed the roots have a high cytokinin to auxin ratio that initiates sucker growth. If a low-intensity fire girdles aspen such that the downward movement of auxin in the phloem is interrupted but the upward

movement of cytokinin continues in the xylem, the tree may survive for several years. Since the cytokinin continues to move out of the roots, it does not accumulate, and suckers do not develop.

Roots may also be stimulated to sprout if the soil is heated. Soil heating can be induced not only by fire, but also by blackening of the soil surface and removal of overstory and duff. The density and growth of suckers are dependent in part on fire severity. A low-severity fire that does not kill all of the overstory may not result in suckers as dense or vigorous as those produced after a moderate-severity fire. Moderate-severity fire which kills all remaining canopy stems and removes duff may result in dense and vigorous suckers.

Prescribed burning will also invigorate grasses and forbs thus providing additional competition for white poplar. For best results, fire should burn into and through the poplar clone. For thick clones, cut poplar for 1 or 2 years before the burn to allow herbaceous fuel to build up in the clone. If this is impractical, work around the edges, cutting into the clone to allow fire to burn into edges of the clone. Continue to work farther into the clone until fires are able to burn through it.

Repeated burns may be necessary. A single burn may increase the number of suckers. Good results are possible with burning in 3 consecutive burns followed by 2 years without fire then 3 more consecutive years of burning. All aboveground suckers and trunks must be killed the first year for maximum effectiveness. Biennial burns may help control white poplar, especially if used in conjunction with cutting and/or girdling.

### Herbicides

Herbicide treatment is perhaps the most time-efficient method for controlling white poplar and the reduced cost labor may offset the expense of the herbicide purchase. Poplars, in general, can be controlled with several herbicides applied in a variety of methods.

Triclopyr, a broadleaf specific, (trade name Garlon 4 or 3A, Tahoe 3A or 4E, Remedy or Renovate) is effective as a basal bark or cut-surface treatment. Use of triclopyr is best done in the dormant season to lessen damage to non-target species. Great care should be exercised to avoid getting any of the mixtures on the ground near the target plant since some non-target species may be harmed. To avoid runoff and harm to non-target species, do not apply triclopyr if rain is forecast for the following day, over standing water, when the ground is frozen or if there is snow cover. By law, herbicides may only be applied as per label directions and by licensed herbicide applicators or operators when working on public properties.

A 30.0% active ingredient solution of triclopyr in horticultural oil can be applied in a thin stream to all sides of the stem, 6 inches above the base of the plant. A narrow band of triclopyr encircling each stem is needed to be effective. Although the thinline treatment is most effective on stems less than 6 inches in diameter, it may also work on stems larger than 6 inches because poplars have thin bark.

Basal bark treatment with Garlon 4, Remedy or Renovate also is effective. For best results, herbicide should be mixed as a 10.0% active ingredient solution with horticultural oil. Spray this mixture, using a hand sprayer, to the basal portion of the trunk. Spray to a height of 12-15 inches (30-40 cm). Thorough coverage is necessary. Spray until runoff at the ground line is noticed.

Cut-surface treatment with Garlon 3A or Tahoe 3A is also effective in controlling white poplar. Apply a 22.0% active ingredient solution can be applied to the cut surface. It can be sprayed either using a low pressure hand sprayer or wiped on the cut surface using a sponge applicator. Either a stump or girdle can be used for the cut surface. For best results, herbicide should be applied within a few hours of cutting.

#### RECOMMENDED PRACTICES ON BUFFER OR SEVERELY DISTURBED SITES.

All practices recommended for high quality sites may be used on buffer or disturbed sites. Additionally, foliar application of glyphosate may be used following the previously described methods and precautions.

Glyphosate (trade name Roundup, Rodeo, Accord) can be foliar-sprayed on white poplar leaves as a control. Glyphosate is a non-selective herbicide that must be applied to actively growing plants, so care should be taken to not let it come in contact with non-target species. For good control, all leaves on all shoots should be treated. Glyphosate should be applied by hand sprayer as a 1.0% active ingredient solution. Spray coverage should be uniform and complete. **Do not spray so heavily that herbicide drips off the target species.** The herbicide should be applied while backing away from the treated area to avoid contacting the wet herbicide. **Foliar spray of glyphosate should not be used in high quality areas because of potential damage to non-target species.** Do not apply glyphosate if rain is forecast within six hours of application. Rodeo is approved for use around water.

Metsulfuron (trade name Escort, Ally) is a selective herbicide for broadleaf and brush control that has been used for control of poplars in pastures and rangelands in the Pacific Northwest. A suggested mix is 1 ounce of product plus a nonionic or organosilicone surfactant per 100 gallons of water.

#### BIOLOGICAL CONTROL

White poplar is vulnerable to a number of diseases and pests. Among these are cankers caused by *Cryptodiaporthe populea*, *Hypoxylon mammatum*, *Leucostoma nivea*, *Mycosphaerella populorum*, *M. populicola* and *Valsa sordida*, spots and blights caused by *Ciborinia whetzeli*, *Linospora tetraspora*, *Marssonina balsamiferae*, *M. castagnei*, *M. populi*, *M. tremulae* and *Venturi populina*, rootrot (*Armillaria* spp.), anthracnose (*Kabatiella borealis*), poplar borers (*Aceria parapopuli*, *Cryptorhynchus lapathi*, *Mordvilkoja vagabunda*, *Pemphigus populitransversus*, *Saperda calcarata*) and carpenter worms. However, use of these agents and vectors for biological control is not feasible. Many hybrid poplars show resistance to these diseases while many native poplars are extremely vulnerable. Additionally, weakening of the parent tree tends to increase root sprout production.

#### FAILED OR INEFFECTIVE PRACTICES

White poplar is lumped with the leuce-type hybrids. For plants in this group, vegetative reproduction from root sections is most successful, but reproduction from dormant stem cuttings is also possible. Plowing, disking or cultivating may only aid in the spread of the root material, particularly if soil or atmospheric conditions allow the

roots to stay moist. Soil disturbance can also promote invasion by other non-native species.

A single girdling or cutting may only weaken the tree or sprouts and encourage more suckering.

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### REFERENCES

- Burns, R.M. and B.H. Honkala (technical editors). 1990. *Silvics of North America: 2. Hardwoods*. Agriculture handbook 654. United States Department of Agriculture, Forest Service, Washington, D.C. 877 pp.
- Carey, Jennifer H. 1994. *Populus grandidentata*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2004, November 4]. [Accessed November 4, 2004].
- Confalonieri, M., B. Belenghi, A. Balestrazzi, S. Negri, G. Facciotto, G. Schenone, and M. Delledonne. 2000. Transformation of elite white poplar (*Populus alba* L.) Cv. 'Villafranca' and evaluation of herbicide resistance. *Plant Cell Reports* 19:978-982.
- Donahue, R.A., T.D. Davis, C.H. Michler, D.E. Riemenschneider, D.R. Carter, P.E. Marquardt, N. Sankhla, D. Sankhla, B.E. Haissig, J.G. Isebrands. 1994. Growth, photosynthesis, and herbicide tolerance of genetically modified hybrid poplar. *Canadian Journal of Forest Research* 24: 2377-2383.
- English, L.L. 1976. *Illinois trees and shrubs: Their insect enemies*. Circular 47. 6<sup>th</sup> printing. Illinois Natural History Survey, Urbana, Illinois. 88 pp.
- Gilman, E.F. and D.G. Watson. 1994. *Populus alba* - white poplar. Fact Sheet ST-499. University of Florida. Available at: <http://hort.ifas.ufl.edu/trees/POPALBA.pdf>.
- Gleason, H. A., and A. Cronquist. 1991. *Manual of vascular plants of northeastern United States and adjacent Canada*. 2<sup>nd</sup> ed. The New York Botanical Garden, Bronx, New York. 910 pp.
- Guide to trees diseases of Ontario. Online version. Great Lakes Forestry Center, Canadian Forest Service. Available at: [http://www.glf.forestry.ca/treedisease/alphabetic\\_index\\_e.html](http://www.glf.forestry.ca/treedisease/alphabetic_index_e.html). Updated: August 26, 2004. [Accessed: September 8, 2004].
- Herman, D.E., C.M. Stange, V.C. Quam eds. *North Dakota Tree Handbook*. Web version. Available at: [www.ag.ndsu.nodak.edu](http://www.ag.ndsu.nodak.edu) [Accessed: September 8, 2004].
- Howard, Janet L. 1996. *Populus tremuloides*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [Accessed November 4, 2004].
- Invasive Species Specialist Group. *Global invasive species database - Populus alba*. Available at: <http://www.issg.org>. [Accessed September 8, 2004].

- Madejon, P., T. Maranon, J.M. Murillo, B. Robinson. 2004. White poplar (*Populus alba*) as a biomonitor of trace elements in contaminated riparian forests. *Environmental Pollution* 132:145-155.
- Mehrhoff, L.J., J.A. Silander, Jr., S. A. Leicht and E. Mosher. 2003. IPANE: Invasive Plant Atlas of New England. Department of Ecology and Evolutionary Biology, University of Connecticut, Storrs, CT, USA. Available at: <http://invasives.eeb.uconn.edu/ipane>. [Accessed September 7, 2004].
- Meilan, R., K. H. Han, C. Ma, S.P. DiFazio, J.A. Eaton, E.A. Hoiem, B.J. Stanton, R.P. Crockett, M.L. Taylor, R.R. James, J.S. Skinner, L. Jouanin, G. Pilate, S.H. Strauss. 2002. The CP4 transgene provides high levels of tolerance to Roundup herbicide in field-grown hybrid poplars. *Canadian Journal of Forest Research* 32: 967-976.
- Mohlenbrock R. H. 1996. *Forest trees of Illinois*. 8<sup>th</sup> edition. Illinois Department of Natural Resources, Springfield. 331 pp.
- Mohlenbrock, R.H. and D.M. Ladd. 1978 *Distribution of Illinois vascular plants*. Southern Illinois University Press, Carbondale, Illinois.
- Remaley, T. and J.M. Swearingen. 1998. Fact sheet - White poplar (*Populus alba*). Plant Conservation Alliance, Alien Plant Working Group. Available at: <http://www.nps.gov/plants/alien/fact/poal1.htm> [Accessed: September 8, 2004].
- The Nature Conservancy. Element Stewardship Abstract for *Populus balsamifera*, *P. grandidentata*, *P. tremuloides*. The Nature Conservancy. Minneapolis, Minnesota. Database of trees, shrubs, and vines. No date. University of Connecticut. Available at: <http://www.hort.uconn.edu/Plants/p/popalb1.html>. [Accessed; September 8, 2004].
- Mehrhoff, L.J., J.A. Silander, Jr., S. A. Leicht and E. Mosher. 2003. IPANE: Invasive Plant Atlas of New England. Department of Ecology and Evolutionary Biology, University of Connecticut, Storrs, CT, USA. Available at: <http://invasives.eeb.uconn.edu/ipane>. [Accessed September 7, 2004].

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