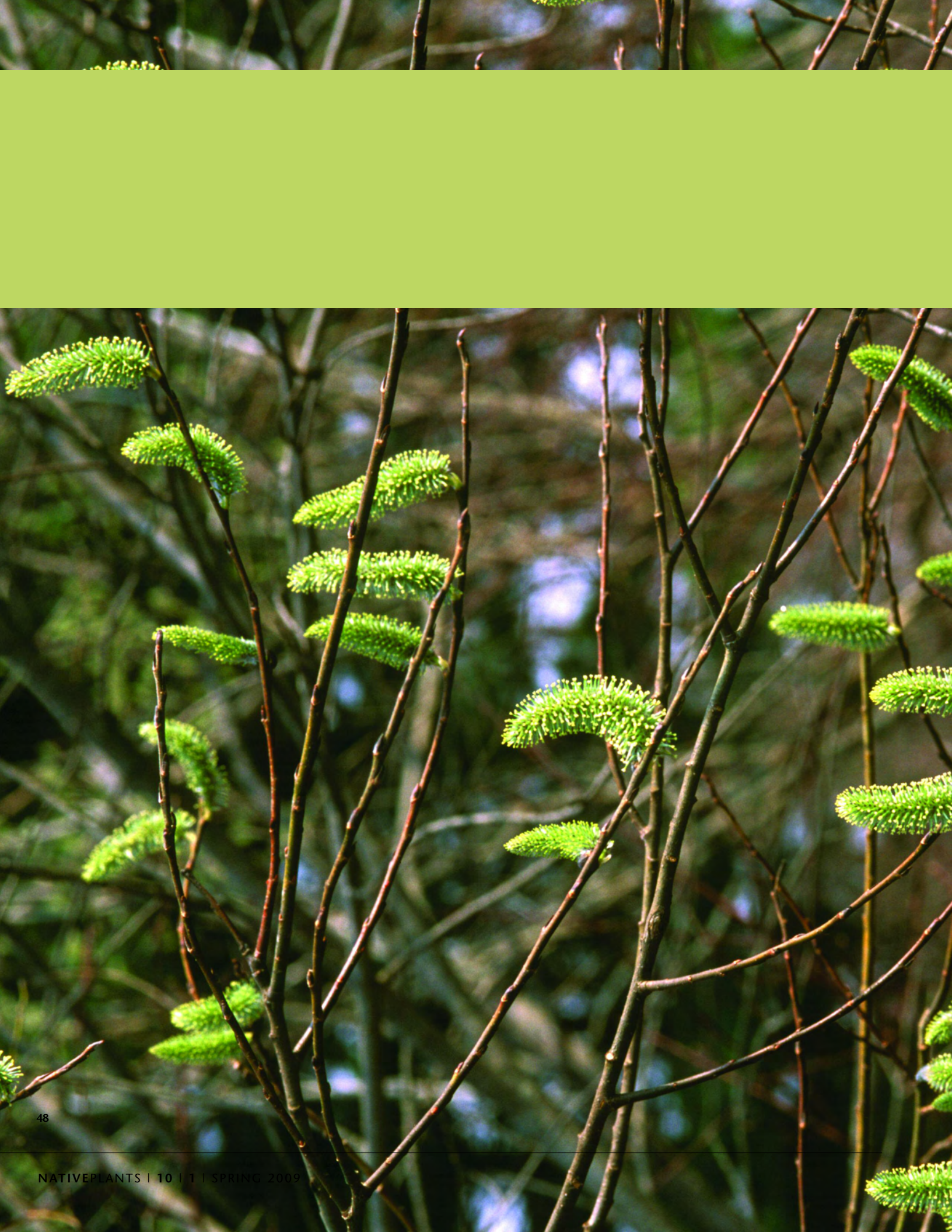

Collecting and processing Salicaceae seeds

| Bernard I Daigle and J Dale Simpson

ABSTRACT

In this article we discuss methods for obtaining quality seeds of Salicaceae species. Proper timing of collection and handling of the catkins are the critical first steps. We also describe a simple forced-air, rotating drum to open the capsules and separate seeds from tufts.

Daigle BI, Simpson JD. 2009. Collecting and processing Salicaceae seeds. Native Plants Journal 10(1):48–51.

KEY WORDS

Salix, *Populus*, seed capsules, collection, catkins, relative humidity

NOMENCLATURE

USDA NRCS (2008)

Salix spp. (willows) and *Populus* spp. (aspens, cottonwoods, and poplars) (Salicaceae) seeds are very small (1 to 3 mm [0.04 to 0.12 in] long). They are short-lived in nature and must germinate shortly after dispersal. The seeds are borne in catkins, which change color from green to a light yellowish brown as they dry and mature. This drying causes the individual capsules on the catkins to split open, thus releasing the mature seeds, which are attached to a tuft of cotton that enables them to be transported long distances by wind or water. Seeds must land on a suitable microsite within a few days or die.

Timing of collection is probably the most important factor to ensure quality seeds. The window of opportunity for gathering is narrow: seeds collected early are immature (Figure 1A) and will yield poor germination, whereas seeds collected late will result in low yields as most of the seeds will have already dehisced from the capsules (Figure 1B). The optimum time is just after the capsules have begun to open. Seed maturity can also be determined by examining seeds. The seedcoats of mature seeds are firm, while immature seeds have seedcoats that are soft and easily depressed. Seed color can also be used to determine maturity. Immature *Populus* seeds are a light tan color, and this color darkens as the seeds mature. Immature *Salix* seeds are greenish and sometimes translucent, turning a dark charcoal, almost black, color when mature.

Beaked willow (*Salix bebbiana* Sarg.). Photo by Joseph G Strauch Jr

Figure 1. Immature catkins of *Salix bebbiana* Sarg. showing green catkins that are still closed (A) and mature catkins of *Populus balsamifera* L. that are dehiscing (B). Photo A by Dale Simpson; Photo B by Bernard Daigle

Figure 2. Tray containing catkins that have opened and are ready for processing. Photo by Bernard Daigle

Figure 3. Catkins being processed in a cone tumbler with a screen wrap with air flow provided by a combination of a shop vacuum and hair dryer. Photo by Bernard Daigle

Catkins should be placed in paper bags as they are collected. This allows moisture to escape and prevents overheating, which could damage seeds. The catkins should be brought to the processing facility as soon as possible and placed on screen trays so that the drying process can continue. One day of drying is usually sufficient, but the rate of drying is greatly affected by relative humidity (RH). High RH will delay the opening of catkins. An optimum situation is a room where RH can be controlled. A dehumidifier can also be used to lower the RH. A "cloud" will appear in the trays as the capsules open, and the seeds and their attached tufts of cotton are released (Figure 2). A second tray can be placed on top of the one with the catkins to avoid contamination from other samples as the seeds and cotton can be easily disturbed by air currents. This process will not open all of the capsules, however, and the seeds will still be attached to the cotton tuft.

The collection and processing methods described by Dawes (2003), Day and others (2003), and Dreesen (2003) are similar in that air movement is used to help dislodge seeds from the cotton. The method used at the National Tree Seed Centre (NTSC) has some similarities but also some distinct differences. The partially opened catkins are placed in a rotating drum measuring 50.8 cm long x 50.8 cm in diameter (20 in x 20 in) and constructed of 0.6 cm (0.24 in) wire mesh that has been covered with standard door screen that allows the seeds to pass through (Figure 3). Processing involves subjecting the catkins to a flow of air created by reversing the air flow from a shop vacuum and supplementing this with warm air from a hair dryer (Figure 3). The warm air flow, in conjunction with the rotating action of the drum, completes the drying process necessary to open the catkins fully and to separate the seeds from the cotton tufts. The dislodged seeds fall though the screen enveloping the drum and are collected in a tray

below. The final step is to lightly blow the seeds in an air aspirator and (or) use sieves to remove large and small particles from the seeds.

This process is very effective in opening the catkins and separating seeds from the cotton tufts. Under ideal conditions (low RH), the processing can be completed in 30 to 45 min. Once separated, seeds should be dried to a moisture content of 5 to 8% and frozen to maintain viability. For details on storage, see Simpson and Daigle (2009).

ACKNOWLEDGMENTS

We are grateful to Donnie McPhee and Alex Mosseler of Natural Resources Canada for their review and constructive comments on a previous draft.

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