

CURRENT ATTITUDES TOWARD AND USES OF TREE TRUNK PROTECTIVE WRAPS, PAINTS AND DEVICES

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Abstract. Landscape planting specifications routinely recommend or require the installation of some form of tree trunk protection. The most commonly specified material is a paper wrap, although research has shown problems with the use of paper wrap and has suggested other materials that should be considered. The current attitudes towards and use of tree trunk protective wraps, paints and devices by International Society of arboriculture members is reviewed, with suggestions for product and planting specification improvement.

Many of the long accepted and recommended practices involved with tree planting and establishment have been questioned during the past twenty years. Research into these practices has resulted in the amendment of many of these recommendations including the size and configuration of planting holes, the use of soil amendments, the use of stakes for support, and the type and extent of top pruning of newly-planted trees.

One practice that has received little attention, despite an increase in commercially available products over the past few years, is the protection of the trunks of newly-planted trees. This practice appears to be a carry over from the painting of fruit tree trunks in orchard establishment to reduce sunscald and frost cracks (1,9,13,22) and the use of physical barriers to prevent rodent feeding.

Landscape background. Sunscald, occurring in both winter and summer, has been reported as a major problem on trees grown for shade in northern locations. Thin- and/or smooth-barked deciduous tree species are generally listed as most susceptible, including birch, maples, linden (basswood), boxelder, and ash (3,6,7,11,15). Some evergreen species, including balsam fir, Douglas fir, spruce and Eastern white pine have also been cited (11).

A good review of materials recommended in the past to reduce sunscald is provided by Litzow and Pellett (15). Recommended materials, primarily for fruit trees, included paper (Kraft), whitewash, white water-base paint, slaked lime, boards and aluminum foil-backed fiberglass, polyurethane, shredded newspapers, aluminum pipe, urethane foam, aluminum paint, and white latex exterior paint (13,22). Litzow and Pellett (15) tried numerous additional materials including white plastic guards (Ross TreeGard), white adhesive gauze tape (Guard-Tex), capillary mats (Water-Mat), polypropylene landscape fabric (Weed-chek Landscape Mat), plastic bubble packing (Aircap



Figure 1 . When tree wrap materials are not removed in a timely fashion, they become not only a visual eyesore, but have the potential to damage the tree.

Barrier Coated Bubbles), and reflective greenhouse insulation (Foylon 7018).

Kesner and Hansen (13) suggested that good quality outdoor white latex paint was the most practical, although their recommendation was for orchard trees. The use of white paint on landscape trees is unsightly, however, with the effect persisting for several years.

Since rapid temperature change appears to cause or significantly contribute to sunscald, Litzow and Pellett concluded that paper wrap (Kraft) probably did not provide the anticipated protection because temperature changes behind it were often faster than for unwrapped control trees. They felt that the reflective greenhouse insulation materials (such as Foylon 7018) held the greatest potential for trunk protection because they caused the slowest trunk temperature changes (15).

Current recommendations. A survey of current arboricultural texts (4,20,25), planting guidelines (10,21) and extension publications revealed that most references still recommend the use of a paper wrap, with little or no regard to tree species, location or microclimate. This is in contrast to the latest recommendations of ISA members Shigo (23) and Urban (26), who are now recommending tree wrap use be discontinued, as is the American Forestry Association (16).

Based on the observations of and comments made to the senior author relative to the use of trunk protective materials, and the fact that many new protective materials have been introduced since the previous research (with a variety of impressive-sounding claims), screening trials are currently underway, funded by grants from ISA and the Virginia Nurserymen's Association.

Materials being tested are: conventional paper and burlap wraps; a burlap/nylon wrap (Eaton wrap); wraps made from white, black (DeWitt Cobra) and brown (Kimberly Clark) nonwoven and white needlepunched (EasyGard) polypropylene fabrics (weed barrier fabrics); adhesive wraps made from gauze and tree sap (Guard-Tex and Tree Skin); a thin, chainlink-like metal wrap (Tree Tender); a variety of plastic wraps and structures (Ross TreeGard, Tree Wrap, Tubex, Tree Shield, Easywrap); a black foam structure (Frostproof guard); a thick black rubber guard (Trimmer guard)

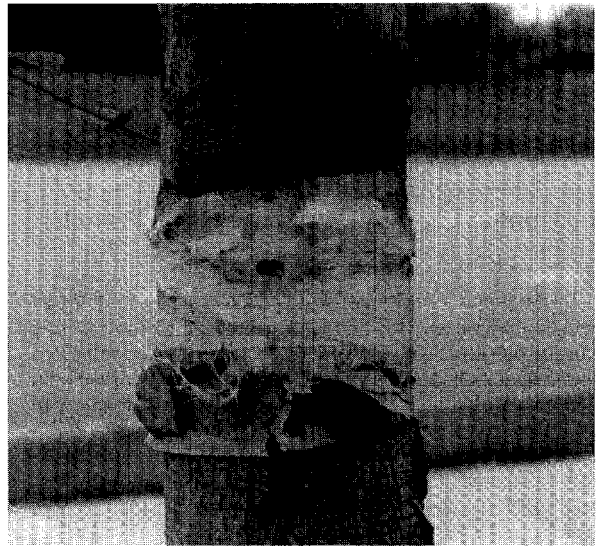


Figure 2. Trunk constriction may not occur if a paper wrap is attached with a material that does not degrade as readily as the paper. Here most of the paper has degraded, but not the tape used for attachment.

and a "natural" paint material (Sil Ka Ben).

Also being evaluated is the effect of numerous of these materials at different transplant dates. Results from these trials will be published at a later date.

Current use attitudes among ISA members. A survey of attitudes toward and current use of trunk protective materials was mailed to all members of ISA in June 1991. Over 250 surveys were returned by August 1, 1991, and the tabulated responses are the bases for the following attitude and use statements. While the responses represented a wide geographical distribution, the majority were received from the midwest, northeast, and mid-Atlantic areas, and from California.

Wrapping, painting or installing other trunk protective devices around all planted trees is no longer a standard practice of ISA members, in contrast with a statement made by Flemer in 1989 that the majority of arborists believe that wrapping is worth the time and expense (5). The majority, if they use protective materials at all, install them relative to tree species and size being planted, planting time of year, site and microclimate peculiarities (street vs. open lawn, exposed vs. sheltered, etc.), and the type of protection deemed

necessary.

The "Textbook" recommendation of protecting the trunk of all newly-planted trees is followed by very few ISA members. Those installing materials on a tree-to-tree basis cited insignificant benefits, expense, and problems they have seen develop from the use of protective materials as reasons to discontinue universal protection.

Many members, under appropriate circumstances, try to discourage the use of materials in situations where they feel they are unnecessary or detrimental. When materials are used, their use is generally temporary, with actual or recommended removal being most often after one year. The major exception was when materials were used for purely physical protection against damage from animals, lawn maintenance equipment,



Figure 3. This tree may have been predisposed to insect and disease attack as a result of tree wrap left inappropriately attached (with tape) for too long a period of time

people and the like.

Though over 50 specific tree genera were named as receiving trunk protection, the majority were thin-barked trees. The top six listed by ISA members were maple, linden, crabapple, oak, locust and ash.

Current product use among ISA members.

Manufacturers of the various protective wraps, paints, and devices list many benefits to be derived from their use. Among the purported benefits listed are protection against damage from: sunscald, or sunscorch, frost, landscape maintenance equipment, animals, insects and diseases, herbicides and vandalism (people). Two additional claims made are that various of the products help conserve the trunk's moisture, and that they reduce sucker and sprout growth.

While protection from sunscald was the top reason that ISA members listed for using protective materials, the next most frequently listed reasons were for protection against equipment and animal damage. Protection against frost damage was listed fourth, and protection against vandalism (people) was listed fifth. It is obvious that the actual or perceived need for physical protection was increased since the use of these materials began.

When asked what materials members are currently using, half indicated paper wrap, accounting for twice the use of the next most commonly used materials, commercially-produced plastic guards. Of other materials mentioned, only "homemade" plastic guards, burlap wrap and paint had any significant usage.

Damage reported from protective material use.

Several reports appear in the literature concerning damage from a variety of protective materials (also see Figures 1-5). In 1978, Hart and Dennis (8) reported that where cracks had occurred in the bark of Norway maple trunks, those wrapped with paper had a dark slimy material oozing from the cracks, whereas those that had not been wrapped had no material oozing from the cracks. Said material was not identified but may have been the result of or a pathogen itself. According to Pirone (20), excess moisture that may be held behind wraps during rainy weather may foster fungal canker development, especially on pin

oaks.

Bark split has been noted on Bradford pears wrapped in a nursery row for digging, with the suggestion that wrapping may have predisposed the trunks to freeze injury by retaining too much moisture and/or heat. Unwrapped pears were not damaged (12). Feucht and Butler (4) cautioned against the use of burlap and other cloth strips because these fabrics do not reflect heat, and once wet, conduct heat which may promote disease development.

Several old reports regarding orchard practices indicated that preventative coating and chemical barriers (various paints, whitewashes, etc.) were ineffective against the common peach tree borer (14,19) and that the wraps themselves created a favorable environment for this pest (14). Recently, a report noted that where dogwood trunks had been left unwrapped, few dogwood borers were found. Where trunks had been wrapped with a plastic guard, larger numbers of borers were found, with more occurring where the wrap was tight against the trunk as opposed to loose (18). This is contrary to claims that wraps (paper and burlap) repel adult borers and prevent egg laying (5), and that if wraps (paper) are too loose, adults will not be prevented from laying their eggs (10).

Litzow and Pellett (15) reported excess moisture retained behind the plastic bubble packing, paper wrap and plastic guards they used, and felt that this might encourage fungal and bacterial growth, especially if any trunk wounds existed. They also noted that as trunk caliper increased, the plastic guard and reflective greenhouse insulation left an imprint on the bark.

Dana (2) reported that cambial damage could be expected if a trunk is wrapped with a dark colored material during the summer, but that wrapping with burlap was not likely to cause high temperature injury.

Some latex paints have been reported to cause injury to certain maple species, with canker infections often resulting (17). Other orchard preventative coatings have been noted to be phytotoxic (19).

When ISA members were asked if they had ever observed damage that they would attribute to the use of some type of trunk protective material, the vast majority said yes. The most frequently seen



Figure 4. Water-soaked bark, which may initiate fungal decay, was present everywhere that sections of paper wrap were still intact on the trunk of this tree.

damage was trunk girdling or constriction, with over half reporting having seen insect injury, and one third some form of disease. Excess moisture, bark damage and cambial death were also frequently reported.

Trunk wrapping by production nurseries.

When asked whether or not ISA members prefer to receive trees from production nurseries with their trunks wrapped, the response was equally split. While half wanted them wrapped to prevent damage during nursery digging and shipping, the other half did not want them wrapped because they wanted to be able to inspect the trunks to insure that they are free of damage and pests. Many felt that nurseries often purposely wrap trunks to conceal wounds caused by equipment, careless handling and improper pruning. Shigo (24) now recommends that trees with wrapped trunks not be accepted.

The best compromise is probably wrapping for digging and transport, but removal of protective materials when trees are delivered so that no question arises as to the condition of the trunks.

Recommendations for protective material improvements. ISA members have offered a variety of suggestions relative to the improvement of protective materials where their use seems warranted. The more commonly listed suggestions included making materials degradable (bio or photo) to help with nonremoval, or reusable to encourage timely removal, easier to apply or install (even sprayable), and chemically treated for borers and



Figure 5. A potentially lethal combination at the base of this tree; tree wrap held in place by a deep mulch layer. The bark and paper wrap were water-soaked and stained, and mushrooms growing on the mulch were evidence of the saturated condition.

other possible pests. Materials need to be tougher, expandable and reflective, and provide better insulation and aeration around the trunks. All this while making a more aesthetically acceptable product for the landscape.

Summary.

Though the original reason for recommending the protection of trunks of newly-planted trees, reduction of damage by the sun, is still important to arborists, of total greater concern appears to be purely physical protection against numerous destructive forces. The majority of ISA members feel that the decision to use a protective material should be made on an individual tree basis, factoring in a variety of plant, site and environmental considerations.

One very real concern is that no matter what initial benefits may be derived from these materials, and no matter what improvements may be made in available protective materials, the recommendation to remove materials after a prescribed period of time is in great part unknown or ignored. Because tangible injury has been seen from the use of many of these materials, the possible short-term benefits should be weighed against possible long-term damage.

It is the recommendation of the authors that the widespread use of predrawn planting specifica-

tions, used by many landscape architects and other practitioners, be eliminated. This would stop the mandated use of tree protective materials, in particular tree wrap paper, and other planting-related activities that are no longer universally endorsed. It is further recommended that planting specifications be drawn for each planting job, with appropriate consideration being given to tree species and size, planting time of year, site and microclimate peculiarities, and the type of protection (against sunscald, equipment, people, etc.) desired. Where trunk protection materials are needed, appropriate materials should be selected, and they should be checked frequently for refitting until they are removed.

With increasing emphasis being placed on the selection of the most appropriate tree for each landscape site, it is time that the most appropriate planting techniques likewise be adopted.

Literature Cited

1. Brown, G.G., W.M. Mellenthin, and L. Childs. 1964. Observations on winter injury to apple and pear trees in the Hood River Valley. Bull. Oregon Agric. Exp. Sta. 34 pp.
2. Dana, M.N. 1991. *Shade tree cambium temperature as influenced by summer wrap and its relation to trunk damage*. ISA Today 4(1):7.
3. Davis, S.H. and J.L. Peterson. 1980. *Trunk decay on Greenspire linden*. J. Arboric. 6:258-260
4. Feucht, J.R. and J.D. Butler. 1988. *Landscape Management*. Van Nostrand Reinhold Company, New York. 179 pp.
5. Flemer, W. III. 1989. *Successful tree planting*. Grounds Maintenance 24(9): 48-50, 52, 54, 109.
6. Godman, R.M. 1959. *Winter sunscald on yellow birch*. J. For. 57: 368-369.
7. Green, S.B. 1902. *Forestry in Minnesota*. Geological and Natural History Survey in Minnesota, St. Paul. 401 pp.
8. Hart, J.H. and G.K. Dennis. 1978. *Effect of tree wrap on the incidence of frost crack in Norway maple*. J. Arboric. 4: 226-227.
9. Harvey, R.B. 1930. *Sprays for the protection of trees against sunscald and rodent injury*. Proc. Amer. Soc. Hort. Sci. 27: 548-549.
10. Himelick, E.B. 1991. *Tree and Shrub Transplanting Manual*. International Society of Arboriculture, Urbana, IL 78 pp.
11. Huberman, M.A. 1943. *Sunscald of Eastern white pine, Pinus strobus L.* Ecology 24: 456-471.
12. James, B.L. 1990. *Winter damage under trunk wrapping*. Keeping Posted 20(3): 2.
13. Kesner, C.D. and C.M. Hansen. 1976. *Prevention of winter sunscald injury in Michigan orchards*. J. Amer. Soc. Hort. Sci. 101: 546-550
14. King, J.L. 1917. *The lesser peach tree borer*. Bull. Ohio

- Agric. Exp. Sta. #307: 399-448.
15. Litzow, M. and H. Pellett. 1983. *Materials for potential use in sunscald prevention*. J. Arboric. 9: 35-38.
 16. Moll, G. and P. Rodbell. 1990. *The best way to plant trees*. The Virginia Gardener 9(10): 1.
 17. Mosher, G.G. and R.A. Cool. 1974. *Protective paint induces canker formation*. Arborists's News 39: 42-44.
 18. Owen, N.P., C.S. Sador, and M.J. Raupp. 1991. *The effect of plastic tree wrap on borer incidence in dogwood*. J. Arboric. 17: 29-31.
 19. Peterson, A. 1923. *The peach tree borer in New Jersey*. Bull. New Jersey Agric. Sta. #391: 1-143.
 20. Pirone, P.P., J.R. Hartman, M.A. Sall and T.P. Pirone. 1988. *Tree Maintenance*. Oxford University Press, New York, 514 pp.
 21. Robinette, G.O. and R. Nehring. 1983. *Planting Detail*. Van Nostrand Reinhold Company, New York. 251 pp.
 22. Savage, E.F. 1970. *Cold injury as related to cultural management and possible protective devices for dormant peach trees*. HortScience 5: 425-428.
 23. Shigo, A.L. 1991. *Modern Arboriculture*. Shigo and Trees, Associates, Durham, NH. 482 pp.
 24. Shigo, A.L. 1991. *Proper pruning respects trees*. Landscape Management 30(1): 54, 56, 58.
 25. Tattar, T.A. 1989. *Diseases of Shade Trees*. Academic Press, New York. 391 pp.
 26. Urban, J. 1989. *New techniques in urban tree planting*. J. Arboric. 15: 281-284.

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