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PROPAGATION OF BAMBOO AS BLACKBIRD LURE ROOST HABITAT

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ABSTRACT: Bamboo and native cane species have been suggested as optimal lure roost habitat for shifting blackbird winter roosts away from objectionable urban/suburban sites. As the second phase in developing this potential concept of alleviating conflicts with blackbirds, we report on information gathered from the literature, consultations with bamboo horticulturists, and on-site visits to previously developed bamboo plantations to select desirable species of bamboo for this purpose, and to identify preferred propagating techniques. Bamboo species *Phyllostachys rubromarginata* and *P. nigra henonis* ranked highest in terms of greatest cold tolerance, greatest propensity for lateral spreading, and most suitable structure characteristics for maintaining blackbird roosting population densities. The planting of selected rhizome cuttings at 5 X 5 m (16 X 16 ft.) spacing in the early spring was found to be the most practical method of successfully developing desirable roosting habitat in 3-4 years. Other considerations in propagating and managing bamboo as blackbird roosting habitat are discussed.

Key words: Bamboo, blackbirds (Icterinae), blackbird lure roost, cane, roost habitat.

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Residents of the southeastern United States have long been concerned about the large winter blackbird, common grackle (*Quiscalus quiscula*), red-winged blackbird (*Agelaius phoeniceus*), brown-beaded cowbirds (*Molothrus ater*) and european starling (*Sturnus vulgaris*) roosts that occur there (Graham 1976). Most of these concerns develop where roosting assemblages occur near human habitation. These urban/suburban situations cause substantial nuisance problems (Bliese 1959, Meanley 1975, and Garner 1978), and, when recurring in specific sites over several years, are histoplasmosis threats to these communities (Chick et al. 1980, Latham et al. 1980). Past approaches to alleviating problem roost situations have been forced relocation and lethal control. Forced relocation of the roosting population using either fright producing devices (Mon 1980) or habitat alteration (Garner 1978) is often successful in reducing problems, but presents the risk of moving birds to an equally less desirable location (Mon 1984). In some situations, lethal control of the local population at the roost site has occasionally been used. Although sometimes effective, it presents additional problems associated with carcass removal that may exacerbate the histoplasmosis threat (Glahn et al. 1991). One possible means of alleviating urban/suburban roost problems is to establish roosting habitat away from human habitation that would be sufficiently attractive to shift roosting blackbirds away from objectionable sites (Glahn et al. 1994).

According to data from winter roost surveys (Glahn et al. 1994), blackbirds repeatedly use bamboo and canebrakes as roosting habitat. Given bamboo's limited availability

compared with that of more commonly used habitat in woodlands and marshes, the widespread and repeated use of bamboo habitat may suggest that bamboo is a preferred roosting habitat (Glahn et al. 1994). The physical characteristics of bamboo may provide optimal habitat with regards to ecological benefits of thermoregulation and predator protection and appears to concentrate a large number (≥ 1 million) of birds in a very small $9 \leq 1$ ha areas (Glahn et al. 1994). Unlike some roosting habitats that may have reduced attractiveness over time due to succession or are destroyed from over fertilization with bird droppings, once established, bamboo appears to remain attractive as roosting habitat for decades (Glahn et al. 1994).

There are little data to suggest that blackbirds prefer certain species of bamboo over others. However, E. P. Hill (Denver Wildl. Res. Ctr., pers. commun.) observed that blackbirds appeared to prefer bamboo species with lateral branching from base to tip. Physical characteristics and growth habits of certain bamboo species might facilitate their use as a potential lure roost habitat. The purpose of this study was to identify some of the most desirable species of bamboo for this purpose and to recommend the most efficient methods to establish bamboo plantations for use as blackbird roosting habitat.

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METHODS

We used the following criteria to qualitatively rank bamboo species that had been previously cultivated as to their suitability for developing as blackbird lure roost habitat: (1) degree of cold tolerance to maximize the geographic area where it could be cultivated; (2) degree of lateral spreading to establish a stand quickly; (3) degree of vertical height with stout stems to support vertical layering of birds; (4) degree of vertical branching on the main stem from base to tip; and (5) degree of sturdiness and number of branches at each node. In addition, we also considered the possible means of successful propagation with these species. To assess these criteria and to examine practical means of propagation- we reviewed the literature and consulted horticulturists. In addition, we also visited the Auburn University Lower Coastal Plain Substation in Camden, Alabama to examine species of bamboo that had been cultivated there since the 1950's. During this visit, on 27 October 1992, we observed fall roosting blackbirds as they selected from 19 species of bamboo, each in its own distinguishable plot (approx. 1/5 acres), from which to roost.

RESULTS AND DISCUSSION

Bamboo Characteristics

The United States has 2 native species of bamboo, a member of the grass family, *Arundinaria gigantea* (giant cane) and *A. tecta* (switchcane); however a large number of exotic species, primarily *Phyllostachys* sp., have been successfully cultivated throughout the country (Sturkie et al. 1968).

There are 2 types of bamboo, clump and running. Running bamboos spread by rhizomes up to 4.6 m per year (Sturkie et al. 1968) and was the only type considered suitable for our purpose. The running type, which includes both native cane and *Phyllostachys* sp., is also more cold tolerant than the clump type (Sturkie et al. 1968) and some species are reported to withstand temperatures of less than - 20°C (Lawson 1968, McClure 1957). The hardiness zones of these latter species (Anonymous 1961) overlaps the range of most winter roosting blackbirds and starlings in the southeastern United States.

Bamboo canes vary height from 5 cm to over 21 m tall (Sturkie et al. 1968). We considered 4 m to be a minimum height for blackbird habitat. Similarly the diameter of canes from *P. bambusoides* (timber bamboo) can reach 15 cm (McClure 1957). We did not consider bamboo species suitable

if the diameter was less than 2 cm. Bamboo produces branches of varying lengths and diameters that contain evergreen leaves. Usually branches occur only at the upper nodes (Sturkie et al. 1968), as is the case of *Arundinaria* sp., but other species may have branching from base to tip (Lawson 1968). The extent of branching both vertically and horizontally would appear to define the degree of perching space available for roosting.

Propagation of Bamboo

Soil conditions for bamboo growth are not demanding, but good drainage is essential. With proper fertilization bamboo can be successfully grown on most well-prepared, well-drained upland sites (Sturkie et al. 1968). A complete fertilizer used for lawns is recommended (Anonymous 1961). Enough watering or rain is needed every 7-10 days for the first year after planting, mature stands can withstand long periods of drought (Sturkie et al. 1968). In early stages of plant growth weed control with applications of Simazine® (use of trade names does not imply government endorsement of commercial products) at 3.4 kg/ha has been successful (Sturkie et al. 1968).

There are 2 primary methods of propagating bamboo: (1) from clump division (2) from rhizome cuttings (Sturkie et al. 1968). Planting divided clumps from nursery stock in the early spring (February through March) is the traditional and generally most prevalent method of propagating bamboo vegetatively (McClure 1966). Divided clumps typically have better survival rates and require less care than do planted rhizomes (Sturkie et al. 1968). Planting divided clumps consists of digging up and dividing individual plants with an attached viable rhizome together with a ball of soil around it and carefully transporting and planting the divided clump at a prepared location (Sturkie et al. 1968, Lawson 1968, McClure 1966, Adamson et al. 1978, Anonymous 1961, White and Childers 1945). McClure (1966) recommends using 1-2 year old culms from the periphery of an existing stand and pruning the majority of foliage, but leaving enough foliage for maintenance until the new root system is established. The divided clumps can best be protected and transported by wrapping the ball of soil and roots with material such as burlap and kept moist (J. Little, Agric. Exp. Sta./Camden, pers. commun.). Divided clumps should be planted about 6 cm lower than they grew in the nursery and a depression should be left around the plant to help hold water (Sturkie et al. 1968). Dividing clumps is very labor intensive (White and Childers 1945). Little (Agric. Exp. Sta./Camden, pers. commun.) recommends using a backhoe or large plow to initially lift the culms and divide the clumps by hand tools. Although this may be the most consistently successful method of rapidly developing a stand of bamboo, it involves transporting large amounts of soil and plant material, estimated at 1900 kg/ha of area, to be planted.

Planting rhizomes consist of digging up and cutting off young viable rhizomes from the mother plant in the early spring

February through March), washing rhizomes free of soil, packing in moist sawdust or moss for shipping (J. Little, Agric. Exp. Sta./Camden, pers. commun.), and planting in a well prepared and watered location about 10-12 cm deep (Sturkie et al. 1968, Lawson 1968, McClure 1966, Anonymous 1961, Adamson et al. 1978). Identification of viable rhizomes is essential and 2-year-old rhizomes are preferred. Viable rhizomes have buds that are bright, and roots growing from the nodes are bright and vigorous. Rhizomes that are dark in color with dark buds and few vigorous roots are old and not suited for propagation. Rhizomes could also be dug with a backhoe or plow and cut with any sharp tools such as an ax or spade and cut into 30-38 cm lengths for planting (Sturkie et al. 1968). Planting of clumps or rhizomes could be simply accomplished by plowing rows, placing the plant material in the rows, and covering with another pass of the plow (J. Little, Agric. Exp. Sta./Camden, pers. commun.).

Although requiring less labor and plant material to establish, rhizome plantings generally have lower survival rates than do divided clump plantings. However, Sturkie et al. (1968) reported that *P. nigra henonis* and especially *P. rubromarginata* had survival rates equalling or exceeding that of other species propagated by divided clumps.

With either-the divided clump planting method or depending on species, the rhizome method, survival would most likely average 50 percent. Spacing of clumps and rhizomes should consider the expected survival rates and degree they are likely to spread. Because preferred bamboo species will spread rapidly after propagation, plant spacing of 5 X 5 m (16 X 16 ft.) can produce a dense stand (27,000-96,000 canes per hectare) in 3-4 years (Sturkie et al. 1968). Closer spacing would not likely develop a dense stand any sooner (3-4 years), because of the time needed for culms to

fully develop. At this spacing approximately 420 clumps or rhizomes would be needed per hectare. However, the area needed to support a major blackbird roost would appear to be less than 1 ha (Glahn et al. 1994) and depending on structure of the selected species, may be considerably less.

Desirable Bamboo Species

Because of the variation in structure and response to propagation, the most important factor in attempting to develop blackbird roosting habitat is the selection of appropriate species for this purpose. This variation in structure and growth response is reflected in our ranking scores for 8 selected bamboo species (Table 1). *P. rubromarginata* and *P. nigra henonis* had the greatest cold tolerance. These species are reported to have not suffered any winter damage at Camden in over 30 years (J. Little, Agric. Exp. Sta./Camden, pers. commun.) and are reported to withstand temperatures of -20° C (McClure 1957). *P. rubromarginata* and *P. bambusoides* (timber bamboo) achieves the greatest height of 10 and 22 m, respectively (McClure 1957). Four of the 8 species, including *P. rubromarginata*, *P. nigra henonis* and *P. flexuosa* have vertical branching from base to tip (Fig. 1). E. P. Hill (Denver Wildl. Res. Ctr., pers. commun.) indicated that blackbirds (10,000 to 5 million birds) roosted in a bamboo plantation near Auburn University from 1951 until 1978-79 when the bamboo was eradicated. Hill also noticed that bamboo species most heavily utilized were those with branching from base to tip. The extent of branching and height would be important characteristics with respect to sustaining a maximum density of roosting blackbirds on small acreage. The number and sturdiness of these branches would also be important and was rated highest for *P. rubromarginata*, *P. nigra henonis* and *P. flexuosa* (Lawson 1968, McClure 1957).

Table 1. Ranking of selected *Arundinaria* and *Phyllostachys* bamboo species from 1 (Poor) to 5 (Excellent) for characteristics desirable in propagation as blackbird lure roost habitat.

SPECIES	COLD TOLERANCE	VERTICAL HEIGHT	HORIZONTAL BRANCHING ¹	BRANCHING ²	TOTAL SPREADING ³	SCORE
<i>P. rubromarginata</i>	5	5	5	5	5	25
<i>P. nigra henonis</i>	5	4	5	5	5	24
<i>P. flexuosa</i>	4	4	5	5	3	21
<i>P. nigra</i>	4	3	5	4	3	19
<i>Semi A. fastuosa</i>	4	4	4	3	4	19
<i>P. bambusoides</i>	2	5	4	3	3	17
<i>P. aurea</i>	2	3	4	4	3	16
<i>A. gigantea</i>	2	4	4	1	3	14

¹extent of branching from base to tip of plant.

²based upon number of branches at each node, position, and sturdiness.

³extent to which new shoots sprout each season.



Figure 1. Senior author with specimen of (left) *Arundinaria gigantea* (native Giant Cane) and (right) unknown exotic bamboo species illustrating the difference in branching characteristics. (Photo by J. F. Glahn).

The rate of spreading was also the highest for *P. rubromarginata* and *P. nigra henonis* and was reflected in having the highest density of canes reported (Lawson 1968, McClure 1957, Sturkie et al. 1968). Based on ranking all criteria equally, *P. rubromarginata* and *P. nigra henonis* would be the 2 species we would recommend for developing as blackbird roosting habitat. Since these 2 species, particularly *P. rubromarginata* also respond well to propagation by rhizomes (Sturkie et al. 1968) makes them an ideal choice. They would appear to be far superior to the native cane *A. gigantea*, considering that the latter species does not respond well to propagation N. Brown, Agric. Exp. Sta./Auburn, pers.commun.).

Some verification of the desirability of these species as blackbird roosting habitat was observed during our visit to the Camden Substation. At the nursery, with 19 bamboo species arranged in separate 0.15 acre plots, approximately 25,000 blackbirds, mostly common grackles, came to the nursery area to roost. The 3 species of bamboo the birds selected for roosting were *P. flexuosa*, *P. rubromarginata*, and *P. nigra henonis*, with 75 percent of them roosting in *P. flexuosa*.

MANAGEMENT CONSIDERATIONS

Although requiring time and effort to establish, bamboo can be a permanent habitat that might attract blackbirds for decades. However, one aspect of the plant and its use as blackbird roost habitat requires consideration. Most running species of bamboo spread rapidly and may require control to confine them to a small intended site. A simple method used at Camden Substation is to mow with a bush hog around the site each spring to prevent new shoots from maturing (J. Little, Agric. Exp. Sta./Camden, pers. commun.). Repeated mowing can also be used to eradicate a bamboo stand, if so desired (Anonymous 1961). A costly, but permanent method to prevent spreading would be to erect concrete or steel barriers extending 0.7 m into the soil around the perimeter (Sturkie et al. 1968, DeRosa 1992, Anonymous 1961). Another method would be cutting new shoots and treating with herbicides such as RoundUp® (R LaCandro, Rutgers Univ., pers. commun.) (use of trade names does not imply government endorsement of commercial products).

Flowering of bamboo is a rare and irregular event occurring every 30-40 years, that is accompanied by suppression of vegetative growth of the plant (Liese 1987). Although the species we have recommended are likely to recover from this event, some authors have recommended propagating more than one species in the same plot to assure maintaining a healthy productive stand (Adamson et al. 1978).

An important consideration in blackbird roost management is the possible contamination of roost soils with the spores of the fungus that causes histoplasmosis in humans. Roost sites occupied by birds 3 years or more are likely to

harbor the fungus and should not be disturbed (Stickley and Weeks 1985). Most bamboo plantations like the one in Camden, Alabama have served as blackbird roosting habitat for many years and are known to or should be suspected of harboring the fungus. Precautions should be taken in obtaining root stock from these areas. Although obtaining washed rhizomes rather than clumps with soil in the spring would lessen the risk, dust-filtering masks or some other types of respirator should be worn to avoid inhaling spores when these plant materials are dug.

We hope the bamboo species and methods of propagation identified in this study will facilitate future research into lure roost habitat for blackbird management. If proven effective, this technique would provide a valuable tool in urban roost management.

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