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Availability in Florida nurseries of invasive plants on a voluntary “do not sell” list

Contact

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Executive Summary

I assessed the availability of invasive plants in Florida nurseries before and after publication of a voluntary "do not sell" list in 2001. The list was created by the Florida Nursery, Growers and Landscape Association (FNGLA), in cooperation with the Florida Exotic Pest Plant Council (FLEPPC), and included 45 known invasive plants. I compared current availability of species on the list to that in 1999 in a print catalog, and also assessed current online availability (i.e., sales via the internet).

In the catalog, 18 species on the "do not sell" list were available in both 1999 and 2004. They were being sold at 76 nurseries in 1999, and 81 nurseries in 2004. In 1999, ten of those nurseries had more than one species from the list, while in 2004 only five had more than one species on the list for sale. The number of FNGLA members in the catalog selling species on the list increased from 26 in 1999, to 47 in 2004. Fifteen species from the list were available both in 1999 and in 2004, and 19 nurseries sold species from the list at both times. Nine of those nurseries were FNGLA members.

I found 22 additional Florida dealers selling species from the list over the internet. Notably, 13 sold more than one species from the list, and 15 were FNGLA members. An additional 8 species from the "do not sell" list were available online, giving a total of 26 species from the list available via the catalog or online. Overall, then, almost 60% of the plants on the "do not sell" list were available in 2004 at Florida dealers.

Thus, I found no evidence that the program reduced trade in plants on the "do not sell" list in Florida. Greater promotion of the program might be beneficial, as about 75 of the current catalog-based dealers only have a single species available. Still, factors such as online availability, economic realities affecting small businesses, and plant sales by "big box" retailers pose serious challenges to the effectiveness of such voluntary programs.

I. Introduction

Numerous troublesome invasive plants have been introduced into the United States deliberately, often to be used as ornamental plants in the landscape. One report estimated that over half of the invasive plants in the U.S. were deliberately introduced (Randall and Marinelli 1996), and the phenomenon is not unique to the U.S. (e.g., Groves et al. 2005). Examples of invasives that were introduced here as ornamental plants include the following:

- water hyacinth, *Eichornia crassipes*
- Dalmatian toadflax, *Linaria genistifolia* ssp. *dalmatica*
- English ivy, *Hedera helix* L.
- oxeye daisy, *Chrysantheum leucanthemum* L., and
- purple loosestrife, *Lythrum salicaria* and *L. virgatum*

The nursery industry has an ongoing interest in introducing new plants to desirous U.S. consumers. This is demonstrated, for example, by annual "best new plants" lists from trade shows (e.g., http://www.fngla.org/tpie/newPlants.asp). Most introduced plants do not become troublesome weeds, but the threat exists because only a small number of plant species are on the

federal noxious weed list, which allows them to be prohibited from entering the U.S. by the Animal and Plant Health Inspection Service (APHIS) of the USDA.

The nursery industry generally believes that further regulation of plant introductions and sales is not necessary (e.g., Gramling 2003; Mezitt 2003). One strategy they recommend for reducing the threat from potential invasive plants is for nurseries and plant dealers to voluntarily remove known invasive plants from stocks. Gramling (2003) cited the "do not sell" list of 45 species created in 2001 by the Florida Nursery, Growers and Landscape Association (FNGLA), in cooperation with the Florida Exotic Pest Plant Council (FLEPPC). Plants on the list (Appendix A) were chosen based on invasiveness and market share (i.e., species with lesser market share, to limit possible economic hardship for dealers) (D. Gordon, Univ. of Florida, 2004, pers. commun.). FNGLA has not, however, assessed the effectiveness of the program since it was created, and does not collect information on plant sales or availability from members (Gramling, 2003, pers. commun.). In addition, perhaps only half of all dealers in Florida belong to the FNGLA, and might be expected to hear about the program. Information about the "do not sell" list is currently only readily available to the public on the FLEPPC website (http://www.fleppc.org/FNGA/FNGA_Pressrelease.htm) but is prominently displayed in the member area on the FNGLA website (http://www.fngla.org/articles/viewArticle.asp?articleID=13).

My objective was to assess the effectiveness of the FNGLA "do not sell" list by comparing plant availability in 2004 to that before the list was created in 2001. I also assessed current online availability of the species on the list, since that has increasingly become a popular way for consumers to locate hard-to-find plants. Evaluating the effectiveness of this program seems especially worthwhile because this "do not sell" list is relatively mature, and because of the importance of the horticultural industry in Florida. The analysis was requested by Al Tasker of the APHIS National Weed Team, and done by the Center for Plant Health Science and Technology (CPHST), the primary scientific support organization for the Plant Protection and Quarantine (PPQ) division of USDA–APHIS.

II. Methods

Plant availability in a catalog

I assessed availability of plants before and after the "do not sell" list was created using historical and current copies of a popular wholesale catalog for Florida nurseries and plant dealers, PlantFinder® (Betrock Information Systems, Hollywood FL 33024). That catalog includes listings for more than 1,100 advertisers. By comparison, the State of Florida has registered and licensed about 9800 stock dealers and about 7800 nurseries (B. Benson, Division of Plant Industry, 2004, pers. comm.). I looked at listings in a 1999 edition of PlantFinder® and in the April to October, 2004, editions. Data collected were number of plant species available at each time, total number of dealers at which species on the list were available, and the number of those that were FNGLA members in 2004-2005. The FNGLA membership status of dealers was verified online (http://www.fnga.org/locator/searchMembers.asp). Of course, some dealers could have gone out of business or changed their membership status since 1999.

The null hypothesis was that if the program was effective, fewer species on the "do not sell" list would be available in 2004 than in 1999, and at fewer dealers. I might also expect that fewer FNGLA members in particular would be selling species on the list, and that the number of species from the list would have declined at member dealers.

Current plant availability online

Plant sales via the internet have grown significantly in recent years, and may include species on "do not sell" lists. I used the Agricultural Internet Monitoring System (AIMS) of CPHST to assess how many Florida-based online dealers had these species available for sale. AIMS does fast, thorough internet searches for websites containing species names and other key words (Fowler et al. 2004). Sites were then viewed to determine whether the plant was currently being sold and whether the company was based in Florida. Comparisons to online availability in 1999 were not possible. Otherwise, data were the same as above.

III. Results

Catalog availability

Regardless of FNGLA membership, neither the number of species on the list that were available nor the number of dealers selling them decreased from 1999 to 2004 (Table 1). Most important, the number of FNGLA-members selling species on the list nearly doubled, while that number decreased slightly for non-members. Eighteen of the 45 species were available at both times, and the number of dealers selling species from the list was always about 80. In addition, 15 species on the "do not sell" list were available at both times, and 10 of those were available from FNGLA members. Nine FNGLA members sold species from the list in both 1999 and 2004.

The number of dealers offering more than one species from the list decreased from ten in 1999, to five in 2004. Furthermore, 75 dealers offered only one species from the list for sale in 2004. Still, the nursery with the largest number of species available in 2004 had 10, which had increased from 7 in 1999, despite that nursery being a FNGLA member.

One species, *Cupaniopsis anacardioides* (carrotwood), was available at both FNGLA members and non-members in 2004 despite being prohibited by the Florida Department of Agriculture & Consumer Services (FDACS). Three other prohibited species (Appendix A) were not available.

Table 1. Availability in a catalog of plants on the FNGLA "do not sell" list, and number of dealers, for members and non-members of FNGLA and all businesses.

	FNGLA members		Nonmembers		All	
Time period	No. species	Dealers	No. species	Dealers	No. species[1]	Dealers
1999 (before)	13	26	13	50	18	76
2004 (after)	15	47	10	34	18	81
Both times	10	9	9	10	15	19

[1] The total number of species sold is not the sum of numbers for members and nonmembers because some of the same species were sold by both.

Online availability

Using the AIMS software system, I found eight species available online that were not found in catalogs, and 20 species in total. Those were available at 24 dealers, 17 of which were FNGLA members. Finally, 13 of those dealers—or more than half of the total—had 2 or more species available from the list.

Summary

In 2004, 26 of 45 species on the "do not sell" list, or 58%, were available for purchase, either in the print catalog or online. The number of dealers offering species from the list exceeded 100.

IV. Discussion

Study accuracy and results

Catalog listings of plants from before and after the release and promotion of the "do not sell" list provided a reasonable estimate of the effectiveness of the program. Still, the dealers advertising in PlantFinder® were a biased sample, as were online dealers. But, given that about 17,500 nurseries and dealers are licensed to grow and sell plants in Florida (B. Benson, Division of Plant Industry, pers. commun., 2004), the analysis almost certainly underestimated the statewide availability of species on the "do not sell" list. That may be especially true if one included "big box" retailers such as Lowes and Home Depot, where many consumers now purchase plants exclusively.

On the other hand, one caveat of the required approach was that measuring how many dealers decided *not* to sell a plant because of the FNGLA list was not possible, since no public record of the decision exists. Such data would have to come from random surveys of dealers to determine whether they were aware of the list and whether it affected their inventory decisions.

This study was a useful, first assessment of the effectiveness of the FNGLA "do not sell" list. The main finding was that I found no evidence that the program reduced availability of species on the list, regardless of whether dealers were FNGLA members or not. In contrast to my expectations (above), the number of FNGLA members that sold species from the list increased from 1999 to 2004.

The simplest and most likely explanations for why the "do not sell" list was not more effective at reducing availability of species on the list, even with its target audience of FNGLA members, were that 1) the list was not more aggressively promoted, and 2) the lack of incentives for dealers to comply. FNGLA has promoted the list in press releases, two magazine articles, and some newspaper accounts, mostly in 2001. More recently, the program is probably often mentioned at FNGLA or other industry gatherings when the topic of invasive plants is raised. The link in the members area of the FNGLA website is probably worthwhile, but is passive and has no impact on non-members. Perhaps more importantly, dealers have no real incentives to comply. One such incentive might be a certification program for dealers in compliance (e.g., Vickerman 1998). It would probably be best if that was done by the State, but it could also be done by

FNGLA, FLEPPC, or both. Other incentives might include tax breaks or free advertising. Disincentives might include publication of the names of noncompliant dealers, or revocation of FNGLA membership for some time for member dealers selling species from the list, but incentives are favored (e.g., Sigler and Murphy 1989). Regardless, expecting compliance without either real incentives or disincentives is probably unwarranted.

Effectiveness of voluntary "do not sell" lists

Several factors mitigate against the effectiveness of such voluntary programs. First, as demonstrated above, online availability of plants means that consumers can purchase desired species regardless of whether local dealers stock them. I found it particularly troubling that 59% of online dealers sold more than one plant from the list, compared to only 6% of dealers in the print catalog. Because of availability on the internet, state or regional programs in particular may have limited effectiveness. One way to reduce the number of long-distance purchases of invasive plants may be to educate consumers about alternative species that provide the same landscape function (e.g., Ferriter 2003). Effectively communicating the goal of "putting the right plant in the right place" (FNGLA 2005) to *both* consumers and plant dealers seems critical (Harrington et al. 2003).

Second, species were chosen for the list partly because they had low market share. That seems to be common when creating "do not sell" lists (e.g., J. DiTomaso, Cal-IPC, 2005, pers. comm.), and may help increase compliance. But, all else being equal, targeting invasive plants with greater market share would most reduce the risk of escapes by invasive plants. Likewise, large numbers of invasives would likely still be sold at "big box" retailers, unless they also comply with such programs. Although those companies often set inventories regionally, perhaps making them less flexible, recently some companies have shown a willingness to comply (D. Gordon, pers. comm., 2005).

Third, the general attitudes of plant dealers about such voluntary programs are not well understood (but see Hall 2000). Information specifically about how willing they are to comply with "do not sell" lists is needed. I suspect that some dealers will resent being told, by either nursery associations or government agencies, which plants they may and may not make available (Watson 2002). My results support that concern, assuming that most or all FNGLA members were made aware of the "do not sell" list some time since 2001.

Finally, dealers that do not comply with the program can gain an advantage over competitors that do. If consumer demand exists, some dealers will probably make species available, especially when "niche" marketing is commonly suggested as a viable small business strategy (e.g., Nolting 2001; U.S. Small Business Administration 2005). Moreover, game theory indicates that in self-regulatory schemes like this one, opportunism often trumps cooperation (Ashby et al. 2004). That is especially true when a group is large, fluctuating, and decentralized (e.g., Olson 1965), which describes Florida plant dealers. Similarly, many green industry members are reluctant to view the marketing of native or less invasive species as a viable business opportunity (A. Tasker, 2005, pers. comm.). Unless incentives are developed to encourage compliance, and/or more stringent disincentives are put in place for non-compliant dealers (Sigler and Murphy 1989), self-

regulation via “do not sell” lists seems unlikely to reduce the market availability of invasive plants.

Conclusions

Voluntary “do not sell” lists are increasingly being used to try to reduce the availability of known invasive plants in nurseries. I found no evidence that the FNGLA list of 45 invasive plant species—a mature prototype for all such “do not sell” lists—reduced the availability of the species on the list. Moreover, for the target audience of FNGLA members, the number of dealers selling species from the list nearly doubled since 1999. The effectiveness of voluntary “do not sell” lists may be ultimately limited by such factors as online availability, selection of species with low market shares, and a likely competitive advantage for noncompliant plant dealers. Greater promotion of this program would probably have increased its effectiveness, but the lack of incentives for dealers to comply is probably also very important. Voluntary programs can probably be made more effective at reducing the availability of invasive plants, but other strategies, such as consumer education, should also be employed.(Gould et al. 2000)

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Appendix A. Plant species on the "do not sell" list released by the Florida Nursery, Growers & Landscape Association in 2001.

Scientific name	Common name
Adenanthera pavonina	red sandalwood
Agave sisalana	sisal hemp
Albizia lebbeck	woman's tongue
Aleurites fordii	tung oil tree
Alstonia macrophylla	devil-tree
Alternanthera philoxeroides *	alligator weed
Anredera leptostachya	Madeira vine
Aristolochia littoralis	calico flower
Bauhinia variegate	orchid tree
Bischofia javanica	bischofia
Broussonetia papyrifera	paper mulberry
Callisia fragrans	inch plant
Casuarina cunninghamiana *	Australian pine
Cereus undatus	night-blooming cereus
Cupaniopsis anacardioides §	carrotwood
Dalbergia sissoo	Indian rosewood
Enterolobium contortisliquum	ear-pod tree
Flacourtia indica	governor's plum
Flueggea virosa	Chinese waterberry
Hiptage benghalensis	hiptage
Leucaena leucocephala	lead tree
Macfadyena unguis-cati	cat's claw vine
Melia azedarach	Chinaberry
Melinis minutiflora	molasses grass
Merremia tuberosa	wood-rose
Myriophyllum spicatum *	Eurasian watermilfoil
Nephrolepis cordifolia	sword fern
Ochrosia parviflora	kopsia
Oeceoclades maculate	lawn orchid
Passiflora foetida	stinking passion vine
Psidium guajava	*g*uava
Pteris vittata	Chinese brake fern
Rhoeo spathacea	oyster plant (non-dwarf variety)
Rhynchelytrum repens	Natal grass
Ricinus communis	castor bean
Sesbania punicea	purple sesban
Solanum diphyllum	two-leaf nightshade
Solanum jamaicense	Jamaica nightshade
Syzygium cumini	Java plum; jambolan
Syzygium jambos	rose-apple
Terminalia catappa	tropical almond
Thespesia populnea	seaside mahoe
Tribulus cistoides	burrnut
Triphasia trifoliata	limeberry
Urena lobata	Caesar's weed

* Prohibited by the Florida Department of Environmental Protection

§ Prohibited by the Florida Department of Agriculture & Consumer Services