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Landscape Maintenance Firms: II. Pest Management Practices[1]

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Abstract

Landscape maintenance firms in Georgia were surveyed to obtain information regarding pesticide usage and factors that would facilitate adoption of non-chemical pest control measures. The trend in pest control from 1988 to 1993 was toward greater usage of non-chemical control measures. The usage trend for chemicals during that period was an increase for fungicides/bactericides and herbicides and a decrease for insecticides, with growth regulator use remaining steady. Over half (55%) of the pesticides were used for turf management. All firms expect to use about the same amount of pesticides over the next 5 years while increasing the use of non-chemical control measures. Opportunities were identified for landscape architects and university personnel to help landscape maintenance firms reduce the need for pesticides. The two most frequently identified opportunities for university personnel were to sponsor local workshops with specific training for workers on integrated pest management (IPM) practices (35.6%) and seasonal or regular newsletters with IPM reminders (30.0%). The most frequently identified opportunities available to the landscape architects to help reduce pesticide use included: (1) improved plant selection, particularly pest resistant varieties (51.8%), (2) proper site selection/location of plants (14.8%), and (3) more spacing between plants and consideration of final size (13.7%).

Index words: market research, landscape maintenance, IPM, pesticides, turf, plant health care, biological control, plant selection.

Significance to the Nursery Industry

The survey provides insight into the pesticide usage pattern of landscape maintenance firms and several factors that could lead to decreased use of chemical pesticides in the landscape maintenance industry. More than half of the pesticides used by maintenance firms were used for turf management, making these firms a prime target for suppliers of turf pesticides and turf IPM programs. Respondents from landscape maintenance firms indicated that improved procedures for selection of pest resistant plants by landscape architects would reduce the need for pesticides. Nurserymen and university personnel could facilitate decreased chemical usage in the landscape by identifying the pest resistant plant varieties and forwarding this information to landscape architects. University researchers could further assist the landscape industry by enhancing the genetic resistance of the plant varieties to pests.

Introduction

The landscape maintenance industry is an integral part of a rapidly growing landscape industry (5, 13). Landscape maintenance activities are often performed by the same firms that perform installation functions (5) and may account for the fact that the needs of the maintenance functions have not been studied. This study is part of an on-going market research program designed to gather information on the operating needs of each segment of the landscape/nursery industry including landscape maintenance, so that other sectors can service their needs. Previous work has focused on the role of landscape architects (4, 6) and landscape installers (7, 8) in the landscape/nursery industry.

An important function of landscape maintenance firms is the control of pests in the landscape (5) and as such they are involved in pesticide use. Regulations and public concern over the use of pesticides could have an important impact on the landscape maintenance industry (9). Landscape maintenance firms have an economic incentive as well as the health concern of the consumers to reduce chemical pesticide use in the residential and commercial landscapes. Other segments of agriculture have focused efforts on programs such as IPM (2) and environmentally sound production systems (15) to help reduce pesticide usage. A decrease in pesticide use requires that we make IPM work better and this requires a better understanding of the factors that limit implementation of IPM practices by landscape maintenance firms.

The objectives of this study were to determine: (1) trends in chemical and non-chemical pest control measures for the most recent 5-year period; (2) anticipated pesticide use over the next 5 years; (3) the influence of plant type on pesticide use; and, (4) opportunities available to the landscape architects and university personnel to help landscape maintenance firms reduce use of chemical pesticides.

Materials and Methods

Survey questionnaires were mailed to 190 firms which were members of the landscape division of the Georgia Green Industry Association (GGIA), Metropolitan Atlanta Landscape and Turf Association (MALTA) and Georgia members of the Professional Grounds Management Society. Questionnaires were directed to landscape maintenance personnel by way of a cover letter. Questionnaires were initially mailed in November 1993, with follow-up mailing to non-respondents in December 1993 and January 1994.

Size classes were established and results analyzed by size of landscape maintenance firms since market segmentation can help focus marketing plans (3, 17). Earlier market research demonstrated that different size landscape architectural (4, 6) and landscape installation (7, 8) firms in Georgia had different service requirements. Responses were analyzed according to the size of landscape maintenance firm,

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Table 1. Trends in pesticide use by Georgia landscape maintenance firms.

Pesticide	Five-year trend[z]				
	Much less	Little less	About same	Little more	Much more
	percent response				
Insecticides	9	21	52	10	8
Fungicides/bactericides	9	11	39	32	9
Herbicides	2	9	46	35	9
Growth regulators	15	10	46	17	12

[z]Landscape maintenance firms were asked to compare their pesticide usage in 1993 to the usage in 1988 (5 year previous).

based on the 1993 wholesale value of plant material purchased: small (<$25K), medium ($25K–$100K), and large (>$100K). Data were tabulated and analysis of response conducted using PROC GLM and PROC FREQ of SAS (18). Size class was the only independent variable included in the statistical model to perform one-way analysis of variance using PROC GLM. Frequency distributions were determined using PROC FREQ. Responses to the open-end questions were coded, tabulated, and analyzed as previously described (9).

Results and Discussion

The 5-year trend in chemical use by landscape maintenance firms varied with the type of chemical used (Table 1). From 1988 to 1993 use of insecticides probably declined slightly since only 18% of the respondents indicated using a little or much more than 5 years ago while 30% indicated using a little or much less. The decreased use of insecticides may be related to the extensive development of biological insect control agents (1, 11, 16) and other alternatives (11) to chemical control. The trend for fungicides/bactericides and herbicides was rated toward greater use since only 20% of the respondents indicated less use than 5 years ago (Table 1). About twice as many respondents (41%) indicated the use of 'little more' or 'much more' fungicides/bactericides as did 'little less' or 'much less'. The trend toward greater use of herbicides was even stronger with about 4 times as many respondents indicating 'little more' or 'much more' as did 'little less' or 'much less' use of herbicide over 5 years ago (Table 1). These same landscape maintenance firms indicated that the primary complaint received from their customers related to weed control in the lawn or landscape beds (10). It appears that consumer expectations, low tolerance for weeds in their yard, are a driving force in the greater use of herbicides. The use of growth regulators over the same period was rated as 'about same' with about equal distribution of respondents in the lower or higher side. The results did not vary by size of firm and thus the results in Table 1 are presented for all size firms combined.

The use of non-chemical alternative control measures increased significantly during the 1988–1993 period (Table 2). For all size firms, approximately one-half of the respondents (49.2%) indicated greater use of non-chemical control measures as compared to about 8% for less use. As the size of the firm increased (Table 2), the use of non-chemical control measures increased substantially. Approximately 67% of the large firms increased their use of non-chemical control measures which was much higher than for medium (47.0%) or small (37.5%) firms. The substantial difference between large and small firms may be related to the available resources in large firms for adopting new technology or that the customers of large firms are more receptive to the alternative practices. The results (Tables 1 and 2) suggest that the landscape maintenance industry is embracing the use of non-chemical control measures, which could be related to growing public concern over the use of pesticides.

The projected use of chemical pesticides for 1994–1998 was about the same as for the previous 5 years according to this survey (Table 3). For all size firms, about 28% projected greater use of chemical pesticides compared to 29% projecting less use. Small firms had the highest percentage of firms projecting greater use of chemicals (40%), compared to medium (16.7%) or large (25.0%) firms. These results support the contention that while landscape maintenance firms are using more IPM practices, they do not see these practices materially decreasing current use of pesti-

Table 2. Trend in use of non-chemical alternative pest control practices.

Firm size[z]	Five-year trend[y]		
	Less[x]	Same	More[x]
	percent response		
Small	8.3	54.2	37.5
Medium	11.8	41.2	47.0
Large	6.7	26.7	66.7
All firms	7.9	42.9	49.2

[z]Firm size based on 1993 wholesale value of plant material purchased: small (<$25K), medium ($25K–$100K), and large (>$100K).

[y]Respondents asked to compare the use of non-chemical alternatives in 1993 to 1988 (5 year previous); non-chemical alternative included insecticidal soaps, horticultural oils, resistant varieties and biological insecticides.

[x]Combined response for 'little less' and 'much less' and for 'little more' and 'much more' categories.

Table 3. Prediction of future pesticide requirements (1994–1998) of landscape maintenance firms.

Firm size[z]	Future pesticide requirements		
	Less	Same	More
	percent response		
Small	30.0	30.0	40.0
Medium	22.2	61.1	16.7
Large	18.8	56.2	25.0
All firms	29.1	43.1	27.8

[z]Firm size based on 1993 wholesale value of plant material purchased: small (<$25K), medium ($25K–$100K), and large (>$100K).

Table 4. Pesticide use for different plant types.

Plant category	Number of respondents	Amount of applied pesticides	
		%	S.E.
Turf	70	55.2	3.0
Trees	70	12.5	1.3
Shrubs/ground covers	69	32.3	2.8

cides. Possible explanations include: (1) the use of alternative control measures are recent and have not strongly impacted chemical use, and (2) the use of non-chemical control measures have prevented an increased use of pesticides since the level of landscape activity has been increasing (13). Although not directly addressed in this study, the data (Tables 1 and 2) are consistent with earlier findings on pest control in the nursery and greenhouse industry (Garber et al., unpublished results), where the greatest use of non-chemical measures was for insect control. In this and the nursery and greenhouse study, the greatest decrease in chemical use was for insect control. If current IPM practices are preventing greater use of pesticides, additional education and experience may be required to decrease current levels of pesticide usage.

Approximately 55% of current pesticide usage in landscape maintenance is for turf management (Table 4). Shrubs/ground covers accounted for about one-third of pesticides used while 12.5% was used for trees. These results suggest that programs designed to reduce pesticide use in the landscape should have a major component directed toward turf pests, including weed control. Development of a chemical reduction program would require: (1) identification of the chemical and pest control agents for each category of plants, and (2) a comparison with available, or perhaps readily developed alternative materials and biological control agents, and (3) matching the plant selection and the site to avoid pest problems (e.g. use of ground covers or mulch in certain areas to reduce weed problems).

To facilitate a reduction in pesticide usage, landscape maintenance firms were asked to identify opportunities for The University of Georgia personnel to help implement alternative pest management practices (Table 5). The 2 most frequently identified opportunities by all size firms, were: (1) develop local workshops with specific training for workers on IPM practices (35.6%) and (2) provide seasonal or regular newsletters with IPM reminders (30.0%). These 2 suggestions were ranked first or second by all size firms indicating good agreement in the industry on the key opportunities for university personnel.

Other opportunities for University personnel, identified by all size firms, were more on-site consultation by extension agents (13.3%), research on non-chemical alternatives (12.2%) and education of the public on integrated pest management practices (8.9%). The request for more frequent on-site consultation was greatest for medium and large firms (Table 5). This response is consistent with the finding in this study that medium and large firms are making the greatest effort at implementing IPM programs. The request for research on non-chemical alternatives was greatest for the

Table 5. Opportunities for the University of Georgia to help implement alternative pest management practices.

Opportunity area[y]	Firm size[z]			
	Small	Medium	Large	All firms
	percent response			
Local workshops and specific training for workers on IPM practices	28.2	43.0	33.3	35.6
Seasonal/regular newsletters with IPM reminders	33.3	21.4	37.5	30.0
On-site consultation, more agent visits	10.3	21.4	16.7	13.3
Research on non-chemical alternatives	17.9	7.1	4.2	12.2
Educate the public on IPM	10.3	7.1	8.3	8.9

[z]Firm size based on 1993 wholesale value of plant material purchased: small (<$25K), medium ($25K–$100K), and large (>$100K)

[y]Categories of response from the open-end question: Please list two ways The University of Georgia could help you to implement alternative pest management practices.

Table 6. Opportunities for landscape architects to reduce the need for pesticides in the landscape.

Opportunity area[y]	Firm size[z]			
	Small	Medium	Large	All firms
	percent response			
Plant selection, particularly pest resistant varieties	47.1	53.3	54.5	51.8
Proper site selection/location of plants	11.8	13.3	22.7	14.8
More spacing between plants, consider future size	20.6	20.0	4.5	13.7
Consult maintenance contractor during design	2.9	13.3	4.5	4.9
Separate irrigation zones for similar plants	8.8	0.0	4.5	4.9
Design smaller turf areas	2.9	0.0	0.0	2.5

[z]Firm size based on 1993 wholesale value of plant material purchased: small (<$25K), medium ($25K–$100K), and large (>$100K)

[y]Categories of response to the open-end question: Please list two things that landscape architects could do during the design phase to reduce the need for chemical pest control.

small firms (Table 5), indicating that small firms are not as aware of available IPM products and information as are the medium and large firms. Almost 9% of all firms asked university personnel to assist with the acceptance of IPM by educating the public (Table 5). This response probably relates to the fact that with IPM programs there is a greater likelihood of undesirable, or unaccustomed, aesthetic features such as holes in leaves, more insects (many of which may be beneficial) and more weeds.

Landscape architects specify about 75% of the plants used by landscape installation firms in Georgia (7) and, as such, have a large influence on plant material in the landscape. Landscape maintenance firms were asked to identify ways that landscape architects could help reduce the need for pesticides in the landscape (Table 6). The most frequently identified opportunity for landscape architects, by all size firms, was better plant selection, particularly the use of pest resistant plants (51.8% of all responses). This was the top priority for small (47.1%), medium (53.3%) and large (54.5%) firms. Nurserymen could play a key role in facilitating the use of pest resistant plants by identifying such plants in the plant availability lists that they forward to landscape architects on a regular basis. This also suggests that University personnel should develop or identify pest resistant plants. Two other frequently listed opportunities for landscape architects were proper site selection and location of plants (14.8%) and consideration of mature plant size (13.7%). Proper matching of plants and site was more important to large firms (22.7%) than to small (11.8%) or medium (13.3%) firms. The need for greater spacing was more important to small (20.6%) and medium (20.0%) firms than to large (4.5%) firms (Table 6). Other existing opportunities for landscape architects to help landscape maintenance firms reduce pesticide use included, consultation with the maintenance contractor during the design phase (4.9%), use of separate irrigation zones for similar plants (4.9%), and design of smaller turf areas (2.5%). While turf management accounted for 55% of the pesticides used by landscape maintenance firms (Table 4), only 2.9% of the small firms suggested smaller turf areas as a way to reduce pesticide usage (Table 6).

This study demonstrates that landscape maintenance firms in Georgia have decreased their use of insecticides, but increased their use of herbicides and fungicides/bactericides from 1988 to 1993. During the same time period these firms increased their use of non-chemical alternative pest control measures. These results are probably reflective of the greater availability of alternative insect control measures compared to alternative controls for disease or weed control. This study suggests that a program to reduce pesticide use by landscape maintenance firms should include several elements: (1) greater availability of viable alternative control measures for disease and weed control, (2) focus on turf management since this area accounts for 55% of pesticide use, (3) identification of pest resistant trees and shrubs and encouraging landscape architects to specify these plants, and (4) development of on-site IPM clinics and follow-up with IPM newsletters.

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