CHARACTERISTICS OF THE TURFGRASS INDUSTRY IN 2020: A DELPHI STUDY WITH IMPLICATIONS FOR AGRICULTURAL EDUCATION PROGRAMS

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Abstract

The primary purpose of this study was to determine the characteristics of the turfgrass industry in the year 2020 in order to recommend curriculum content for agricultural education programs of the future. Specific objectives were to determine: the general characteristics of the turfgrass industry in the year 2020, a demographic profile of opinion leaders in the turfgrass industry, whether the Delphi technique could be used to achieve consensus among turfgrass experts, the workforce requirements of the turfgrass industry, and the educational requirements of those employed in the turfgrass industry in the year 2020.

This was a national study using a three-round Delphi technique. The panel of experts was nominated by turfgrass professionals (teaching, research and extension) at all the land-grant institutions, the four-year and two-year colleges offering turfgrass, and the executive boards of related turfgrass associations. The 38 most frequently nominated experts were invited to participate in the study. A structured Delphi instrument consisting of nine categories was developed from the literature. This instrument was circulated to the panel of experts for comments on each category. Their responses were used in the development of a structured Delphi instrument consisting of 147 items on a Likert-type scale. The instrument was reviewed for content and face validity by an 20-member panel.

Consensus was achieved on an item if at least 60% of the respondents were in agreement and the composite score fell in the "agree" or "disagree" range. The mean and standard deviations indicated that the central tendency was a movement toward consensus. The responses were found to be very stable from round 2 to round 3, as indicated by the Pearson product-moment correlation coefficient procedure and the Wilcoxon matched-pairs signed-ranks test.

Thirty-two content items were identified as essential inclusion in agricultural education curriculum.

Introduction

Turf is one of the blessings of nature and includes both service and beauty, a concept which originated when man started to domesticate animals (Huffine & Grau, 1971). Turfs were developed by modern specialists in order to further enhance the environment (Beard, 1973). Turf is the most widely grown, most discussed, and least appreciated commodity in the United States (Hanson & Juska, 1971). In discussing this topic, such terms as "turf," "turfgrass," and "grass" have been used through the years. As far as research done with turf and turfgrass, Hanson and Juska stated that much of the initial work on the development and management of turfgrasses was conducted by agronomists who had some training and experience in growing grasses

for pasture and forage.

However, the first published report related to turfgrass research was initiated in 1880 by a noted botanist, Dr. W. J. Beal, of the Michigan Agricultural Experiment Station (Beard, 1982). Interest in the science of turfgrass culture began to manifest itself. Beard indicated that other projects were initiated at the Connecticut Agricultural Experiment Station in 1886, the Rhode Island Agricultural Experiment Station in 1905, and the Arlington Turf Garden, Arlington, Virginia in 1916. To further expand its potential, the federal government cited and allocated funding in turf through the Agricultural Appropriations Act in 1901. Although these federal allocations of funds for research in turfgrass were made, it was not until the end of World War II that most agricultural experiment stations initiated turfgrass research programs (Huffine & Grau, 1971).

Turf industries have been defined in various ways including geographic influence, scope and size, products, market and trade practices, human resources, and public and political policies (Nutter & Watson, 1971). Even though turfgrass has experienced a long existence, it was not until the latter half of the 20th century that the turfgrass industry actually began booming. Thus, public and political policies are either new or currently being developed.

Nutter (1965) noted that the turfgrass industry encompassed the production and maintenance of specialized grasses as required in the development and management of facilities for utility (erosion control), aesthetics (ornamentation), and recreation (sports). It involves turfgrass science and technology, manufacturing, and marketing of turfgrass products and services, business management, human resources, effective communications, and environmental management skills (Nutter & Watson, 1971; Wagner, 1999; Grigg, 1999; Ellis, 1999; Jaques, 1998; Dysart, 1995; Fry, Thien, Miller, Elsea, & Krause, 1998).

This suggests some important questions about the future of turfgrass and the role of agricultural education. What will the turfgrass industry be like in the future? What careers will be available in the turfgrass industry? Will today's turfgrass curriculum in agricultural education prepare students for jobs in an increasingly technological turfgrass industry? Can vocational educators look into the future and develop a curriculum to satisfy and complement this end?

O'Kelley (1969) defined curriculum as "the sum total of the student's experiences and activities under the direction of the school, including teaching materials and methodology" (p. 29). Since curriculum is the life of agricultural education, changes made in the curriculum are long term and far reaching (Iverson & Robinson, 1990). Thus, curriculum content is the basic building block of curriculum planning; without constant monitoring and revision, it becomes stagnant, outdated, and ineffective (Flanders, 1988).

How each individual views the rate, scope, and substance of change is influenced by the personal values and perceptions of the observer (Hawking, 1988). Turfgrass is in a state of change. Traditional management philosophies are being challenged by both professional organizations and the public. Some speak of the need for entirely new management paradigms (Wagner, 1999; Grigg, 1999; Ellis, 1999; Wake, 1999; Jaques, 1998, Dysart, 1995; Fry, Thien, Miller, Elsea, & Krause, 1998).

One thing that certainly can be predicted is that there will be change, even though most systems are compelled by assumptions of stability. Events of minimal

probability are usually ignored even though some unpredictable events are likely to occur. Change comes to a system from the ends of a bell-shaped curve, which are variations of the system. Planning explores possible futures and develops strategies to address those futures (Brighton, 1987).

The future will bring about change, and vocational educators must be ready to accept and react to this challenge. Curriculum development processes have to be adjusted to meet the challenges of the future. Shane (1981) suggested that vocational educators must become involved in curriculum development that considers jobs for tomorrow and the demands of the changing work place.

Curriculum content must be kept up to date in the agricultural education/turfgrass area if students are to be prepared for the jobs of the future. Experts now agree that planning should be based on a futuristic model (Brodzinski, 1979; Finch & Crunkilton, 1999; Gough, 1987;Wiles, 1999). A futuristic strategy utilizing the Delphi technique may be needed to accomplish this goal. The Delphi has been used in government, industry, medicene, regional planning, and education for a variety of situations including futures forecasting, curriculum planning, program planning, policy information and problem identification and solutions (Adler & Ziglio, 1996; Cyphert & Gant, 1970; Iverson, 1993; Lang, 1996; Linstone & Turoff, 1975; Turoff & Hiltz, 1995).

Purpose

The purpose of this study was to determine characteristics of the turfgrass industry in the year 2020. By doing so, program planners will be able to make recommendations based on futuristic research. The results of this study will be useful as a basis for program planning and curriculum development in agricultural education.

This study was needed because the literature search revealed no futures research with specific implications for determining turfgrass curriculum content in agricultural education programs. In addition, further justifications for the study include:

1. Turfgrass instruction in agricultural education programs is a viable means of preparing students for careers in turfgrass and turfgrass related jobs.
2. Regularly updated curriculum content needs to be available to agricultural education teachers to prepare students for turfgrass jobs in the year 2020.
3. The turfgrass industry generates significant dollars annually and accounts for the employment of a considerable number of workers each year throughout the United States. Agricultural education (turfgrass) programs can have a positive impact on the economy of the United States by providing skilled and competent graduates with the ability to become rational and critical thinkers in problem-solving activities as workers.
4. The study is timely. It is crucial that futuristic projections of this format be made since the only certain constant is change.

Objectives

The primary objective of this study was to make recommendations for curriculum content for turfgrass course work in agricultural education programs. This determination was accomplished by employing futures research to determine the

characteristics of the turfgrass industry in the year 2020.

The following specific objectives were developed to direct this study:

1. To identify the general characteristics of the turfgrass industry in the year 2020.
2. To determine whether the Delphi technique was a viable means of eliciting a consensus among those nominated to a panel of turfgrass industry experts concerning the description of the turfgrass industry in the year 2020.
3. To determine the work force requirements of the turfgrass industry and the educational requirements of those employed in the turfgrass industry in the year 2020.
4. To make recommendations for program thrusts and curriculum development in turfgrass-related courses in agricultural education, in order to prepare students for jobs in the turfgrass industry in the year 2020.
5. To develop a demographic profile of those nominated to the panel of experts based upon: (a) education, (b) age, (c) sex, (d) race, and (e) turfgrass industry work experience.

Procedures

This was a national futures study utilizing the Delphi technique. Collection of data consisted of five phases: selection of a panel of experts, instrument development, and three rounds of the Delphi instrument.

To select members of the Delphi panel of experts, nomination letters were mailed to the turfgrass-related representatives of land grant institutions (teaching, research and extension), college and technical school personnel (teaching and demonstration), and executive or administrative personnel of related professional associations. These representatives were asked to nominate five persons who they felt would be best qualified to forecast the future directions of the turfgrass industry. The 38 members of the chosen panel of experts (Table 1) were selected from a list of 428 total nominations which consisted of 194 different people. A total of 110 nomination forms were returned with five or fewer nominations.

An intensive review of the literature revealed no instrument suitable to collect data for the objectives of the study. The investigator developed the format for the instrument, based on the specific requirements of the study which involved the identification of subjective categories from the literature review. Such categories included personnel education and staff development, technology, availability of turfgrass cultivars, turfgrass management services, legal issues, chemical issues, environmental issues, best management practices, and other issues and/or circumstances. These categories were circulated as the first round of the instrument for individual responses from each member of the Delphi panel of experts. A “guide question” and a “sample statement” were composed and included in round one of the Delphi technique, focusing on the subject area of each category. The Delphi panel of experts was instructed to read the “guide question” and “sample statement,” then develop statements that describe how the category will appear or function with respect to the turfgrass industry in the year 2020. For the nine categories, 512 statements were collected from the first round of the Delphi technique.

These responses were developed into a draft of the Delphi instrument consisting

of 164 items in the nine categories. This draft was reviewed by a panel of 20 persons with expertise in the turfgrass industry, in futures research, and/or in education. This review panel assisted in the refinement of the document into a 147-item instrument to be circulated in round two of the

Table 1. Experts Invited to Serve on the Delphi Panel

Name	Affiliation	City, State
Dr. James B. Beard	Texas A&M University	College Station, TX
Dr. Lee Burpee	University of Georgia	Griffin, GA
Dr. Bob Carrow	University of Georgia	Griffin, GA
Dr. Nick Christians	Iowa State University	Ames, IA
Dr. Stephen Cockerham	University of California	Riverside, CA
Ms. Cindy Code	*Lawn & Landscape*	Cleveland, OH
Dr. Karl Danneberger	Ohio State University	Columbus, OH
Dr. Joe DiPaola	Novartis Crop Protection	Greensboro, NC
Dr. Joe Duich	Penn State University	State College, PA
Dr. Milt Engelke	Texas A&M University	Dallas, TX
Mr. Douglas Fender	Turfgrass Producers International	Rolling Meadows, IL
Dr.Reed Funk	Rutgers University	New Brunswick, NJ
Dr. Victor Gibeault	University of California	Riverside, CA
Mr. Gary Grigg, CGCS	Royal Poinciana Golf Club	Naples, FL
Dr. Wayne Hanna	USDA - Agricultural Research Service	Tifton, GA
Mr. Ted Horton, CGCS	Pebble Beach Company	Pebble Beach, CA
Dr. Richard Hurley	Rutgers University	East Stroudsburg, PA
Mr. Ray Jensen	Turfgrass Consultant	Tifton, GA
Dr. Keith Karnok	University of Georgia	Athens, GA
Mr. Mike Kenna	USGA Green Section	Stillwater, OK
Dr. Gil Landry	University of Georgia	Griffin, GA
Mr. Bill Liles	Prokoz, Inc.	High Point, NC
Dr. William Meyer	Rutgers University	New Brunswick, NJ
Mr. James Moore	USGA Green Section	Waco, TX
Mr. Randy Nichols, CGCS	Cherokee Town & Country Club	Dunwoody, GA
Dr. Charles Peacock	North Carolina State University	Raleigh, NC
Dr. A. J. Powell	University of Kentucky	Lexington, KY
Dr. Paul Rieke	Michigan State University	East Lansing, MI
Dr. Robert Shearman	University of Nebraska	Lincoln, NE
Mr. Trevor Smith	Predator Ridge Golf Resort	Vernon, BC
Mr. Jim Snow	USGA Green Section	Far Hills, NJ
Dr. A. J. Turgeon	Penn State University	University Park, PA
Dr. Don Waddington	Penn State University	University Park, PA
Dr. Coleman Ward	Auburn University	Auburn, AL
Dr. Tom Watschke	Penn State University	University Park, PA
Dr. Jim Watson	Toro Company	Littleton, CO
Dr. Richard White	Texas A&M University	College Station, TX
Mr. Stanley Zontek	USGA Green Section	West Chester, PA

Delphi technique to the panel of experts. The instrument used in the study was set up with a Likert-type five-point scale as follows: SD for Strongly Disagree, D for Disagree, U for Undecided, A for Agree, and SA for Strongly Agree.

The data from the first round instrument were carefully transcribed and summarized into the draft for the second-round instrument, which was reviewed for content and face validity. The data collected from the second-round instrument were transferred to computer files. The investigator manually completed the transfer of data and triple checked the instruments and computer answer sheets for accuracy. As a final numerical check, student workers assisted the investigator in comparing the computer sheets to the each respondent's answer. The data were submitted for SAS analysis to the Director of the Office of Information Technology and Statistical Services at the University of Georgia College of Agricultural and Environmental Science Coastal Plain Experiment Station, Tifton, GA (SAS Institute, 2000).

Analysis of the data for the study consisted of primarily descriptive statistics using a practical, non-parametric approach (Conover, 1971). Means and standard deviations were calculated, and the Pearson product-moment correlation coefficient and the Wilcoxon matched-pairs signed-ranks test were computed. Also, the composite score, as used by Dillon and Wright (1980), was also calculated for each item. As an additional test, the medians and interquartile ranges were calculated to further determine convergence of opinion (Conover, 1971).

Findings

Thirty-four (90%) of the 38 nominated experts completed and returned the first round of the instrument. The responses were compiled and organized into the Delphi instrument which was evaluated by a 20-member review team. The second instrument was circulated to the thirty-four experts with thirty (79%) completing and returning the instrument. The most common responses on each item from the second round were compiled and provided to 30 members of the panel of experts, along with the round three instrument. A 66% overall response rate (25 of 38) was attained in round three after two follow-ups of non-respondents.

Two national groups were involved in the process of completing this study. The first group was the nominators who were asked to provide the names of persons for a national panel of experts in the turfgrass industry. The second group was the national panel of experts nominated by the first group. This pool of human resources provided a diverse panel of experts from private and public sectors across the United States.

When asked to indicate the category that best described their current affiliation with the turfgrass industry, 13 (52%) of the 25 members of the panel indicated that they were university educators (teaching, research, or extension), 4 (16%) were professional association directors, 3 (12%) were in turfgrass business and industry, 2 (8%) were turfgrass consultants, 2 (8%) were golf course superintendents, and 1 (4%) was a federal researcher. All twenty-five experts were male and 24 (96%) Caucasian and one (4%) mixed race. They were well-educated with 3 having bachelor's degrees, 5 having master's degrees, and 17 having doctoral degrees. The group had a total of 806 years experience, a mean of 32.2 years in turfgrass. Respondents ranged from 44 to 83 years of age, a mean of 57.6 years. The nomination process was without bias to women or minorities. One woman

was invited to participate from the original thirty-eight invitations but declined. The presence of women in this male-dominated field has been expanding in recent years. A description of the experts is not necessary for the interpretation of the Delphi, but demographic data relative to the panel of experts were important for verification of the expert status of panel members. This information may also be important in the selection of groups for further study.

The use of the Delphi technique, as used for this research study, requires that the participants respond to two rounds of an instrument. An underlying principle was that in the third round the responses tend to converge toward the measure of central tendency, with decreasing variability in scores. A related principle to be measured when using the Delphi technique was stability. Responses are considered stable when the answers do not change substantially from round to round. Delphi studies by Flanders (1988), Varnadore (1989) and McAllister (1992) showed similarity in stability.

Composite scores were calculated to rank order the items in the instrument (Dillon & Wright, 1980). The 147 items on the instrument were marked by the respondents on a five-point Likert-type scale. Only round three of the results were considered for the discussion of composite scores since, by the nature of the Delphi technique, the results of the last round (round three) are the most accurate and therefore of the most value.

Consensus was indicated on an item if both of the following conditions were met: (1) at least 60% (15 of 25) of the respondents were in agreement and (2) the composite score was greater than 87.5 (70% of 125) or less than 62.5 (50% of 125). In other words, the composite scores had to be in either the agreement or disagreement range. The two required conditions indicating consensus were met on 114 of the 147 items (78%) with 113 items scoring in the agreement range and one item scoring in the disagreement range. This one item concerned pesticide and fertilizer applications being available only on a contractual basis and performed by individuals licensed by the federal government (#51). Thus, thirty-three items (23%) failed to meet the required criteria for consensus. However, three of those items, #57, #110, and #125 were closely approaching consensus but did not meet the criteria with the composite score only. Turfgrass management companies will offer the golf course superintendent additional opportunities to grow in professionalism (#57, composite score of 87). Turfgrass managers will be required to have fertilizer and pesticide application programs approved before they can be implemented (#110, composite score of 84). And, low-input, sustainable turfgrass management will be the key (#125, composite score of 87). Two items had 15 or more respondents that marked choice number 3 (Undecided) on the survey instrument. These items were #18: Laser mowing will become an integral part of improved technology, and #146: Laser and other cutting methods will remain too expensive and produce unsatisfactory cutting units.

A composite score was calculated on round three data for each item and was used to rank the items in order of agreement. The highest-ranked and lowest ranked items are identified in Table 2. The standard deviations indicated that the group answers were moving toward consensus. As measured by standard deviations, 59% of the items moved toward the mean. Stability of the responses from round two to round three was measured using the Pearson product-moment correlation coefficients and the

Wilcoxon matched-pairs signed-ranks test. Responses were found to be very stable (not significantly changed) in 145 (99%) of the items as measured by the Pearson product-moment correlations and in 147 (100%) of the items as measured with the Wilcoxon matched-pairs signed-ranks test. The medians and interquartile ranges for all items on round two and three and the change in interquartile ranges from round two to round three were also reported.

Table 2. Items of Highest and Lowest Rank by Composite Score in Round 3

Highest Ranked Items

#	Item	Score	Rank
12.	Computers will play a major role in the educational, decision-making, and recordkeeping processes of the turf manager's job	121	1.0
14.	More sophisticated equipment will be available for the maintenance of turfgrass sites	118	2.5
7.	More training will be available "on line" which should give turf managers better access to information on turfgrass management	118	2.5
102.	Environmental issues of great concern will be the use of scarce water resources, and the prevention of water pollution	114	5.5
48.	Services will increase, but the individual on-site superintendent will continue to be the core of the industry	114	5.5
28.	New cultivars with improved performance potential will continue to become more available	114	5.5
6.	Turfgrass managers must have at least a 2- or 4-year degree in an area of plant or soil sciences to be eligible for superintendent certification	114	5.5
134.	In addition to technical skills, turf managers will need to know people management, risk management, environmental stewardship, communication skills, business administration, and foster public relations and image management to their employer and to members of the community	113	9.0
96.	Expanded use of treated water and less potable water will be the focus of turf managers.	113	9.0
10.	More emphasis will be placed on meeting the requirements of the many environmental regulations	113	9.0

Lowest Ranked Items

#	Item	Score	Rank
51.	Chemical (pesticide and fertilizer) application will only be available on a contractual basis and performed by individuals licensed by the federal government	62	147.0
50.	Regulations may require contractual services for aeration of turfgrass sites	65	146.0
137.	Golf courses and other turfgrass areas will have on-sitelaboratories as a means of conducting various research programs, cooperating with state and federal agencies	67	145.0
81.	All turfrass personnel, regardless of level, will be required to have a license to operate various pieces of maintenance equipment as an expression of competency	68	144.0
20.	Subsurface irrigation techniques will become more commonplace	69	142.5
41.	The longevity of cultivars will be only 3 or 4 years because of continuous improvements, genetic changes in population, and plant protection patents	69	142.5
58.	Contractual management services will be standard by the year 2020 which will lower management costs and lessen liability expense	72	140.5
62.	Public institutions, grounds, and parks will primarily be managed by private firms on a contractual basis	72	140.5

Conclusions

Based on the review of the literature and findings of this study, several conclusions were reached. These were:

1. The turfgrass industry will grow and change rapidly into the year 2020, with increasing emphasis on protecting the environment through best management practices.
2. Opinion leaders in the turfgrass industry can best determine curriculum content for turfgrass programs of the future.
3. The Delphi technique was effective in determining consensus among turfgrass experts regarding future characteristics of the industry.
4. There will be increased employment opportunities and a corresponding need for training programs in turfgrass.
5. There is a need to continually update the turfgrass curriculum in agricultural education programs.

Recommendations

As a result of this research study, it is recommended that:

1. The Delphi technique should be employed as a common method to project curriculum content for agricultural education course work.
2. The turfgrass curriculum in agricultural education should be continuously updated using leaders in the turfgrass profession as resources in the planning and development of curricula. The curriculum should be updated every five years so that students will be prepared for all but the most recent advances in technology. This would benefit both the turfgrass industry and the vocational education curriculum specialists.
3. Teachers of agricultural education should be continuously updated with the assistance of turfgrass industry resource people. Prospective teachers should be required to take course work in turfgrass. The content of this course work should have been kept current utilizing futuristic methods. Workshops and seminars should be conducted on a regular schedule and include representatives from turfgrass enterprises, public and private.
4. Post-secondary vocational programs should offer more educational services for the turfgrass industry. Most of the continuing education programs currently being offered are directed towards restricted use pesticide licensing. Adult training and continuing education for industry employees is a need that vocational education at the post-secondary level can further provide.
5. As opportunities increase in the turfgrass industry, turfgrass course work in agricultural education should be expanded and emphasized. Recruitment of students into turfgrass programs should be based on expanding career opportunities. Groups that are traditionally lacking in representation in turfgrass, such as minorities and women, should be actively recruited into turfgrass programs. Employment opportunities for students with turfgrass beyond the secondary level should be included in the curriculum. The turfgrass industry should be viewed with a continuing positive

and professional image, and principles of professionalism, etiquette, and ethics should be included in the curriculum.

6. Curricula for turfgrass course work in agricultural education should be expanded to include the application of the basic cultural practices of mowing, fertilization, and irrigation. The students should be prepared for lifelong learning through continuing education, whether private or public. The turfgrass industry has become more complex requiring more advanced and refined job skills. Communications, social, and problem-solving skills should be included in the curriculum. Students should be exposed to environmental concerns, worker safety, economics, and governmental regulations that impact production, maintenance, and management of turfgrass. Furthermore, future generations of turfgrass employees will further need to assimilate knowledge of behavioral science and social-cultural systems into biological and technical conceptions of turfgrass.
7. The 32 curriculum content items identified by this study should be included in the turfgrass curriculum in agricultural education (Table 3).

Table 3. Curriculum Content Items

Computer competency and applications	World wide web training and competency
Sophisticated turfgrass maintenance equipment	Environmental concerns
Water conservation and use	Environmental stewardship
Contractual services in turfgrass maintenance	New cultivar understanding
Certification needs	Effective communication skills
Human resource management and ethics	Risk management
Business management skills	Environmental regulations
Integrated pest management programs	Continuing education
Lifelong learning	Best management practice programs
Chemical fate	Wildlife and plant preservation
Natural area protection	Record keeping
Nutrient management programs	Public relations
Pesticide application	Consulting services
Remote sensing technologies	Genetic engineering
Ecology services	Management companies
Pest scouting	Professional and trade organizations

Implications

As a result of the findings and conclusions presented in this study, the following implications are presented:

1. The turfgrass industry will likely continue to provide opportunities for employment of effectively trained employees. And, agricultural education programs will likely continue to offer the turfgrass option. Furthermore, agricultural education teachers will likely need more assistance in adapting to and

managing change. And, curriculum specialists will likely be employed in each agricultural education district office to provide assistance in preparation and implementation of the curriculum.

2. Leaders in the turfgrass industry are recognized as opinion leaders and are considered capable of forecasting the future of the industry. It is probable that these opinion leaders in the turfgrass industry can best determine the content of turfgrass course work in agricultural education to prepare students for future turfgrass jobs.
3. The Delphi technique is effective in achieving consensus and will be more likely utilized in determining curriculum content.
4. There will likely be increased opportunities in the turfgrass industry for effectively trained employees with high school, vocational school and technical college education, as well as graduates of baccalaureate, masters, and doctoral programs. Furthermore, vocational and technical programs will likely need to emphasize and teach communications and human relations skills, as well as critical thinking and problem-solving skills. In addition, turfgrass enterprises will likely further promote training and continuing education for their employees as lifelong learning is realized.
5. The specific curricula subject areas outlined in the recommendations are based on the opinions of the most frequently nominated turfgrass experts in the United States. Thus, it is probable that they be consulted and their services utilized in updating turfgrass curriculum in agricultural education programs.

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