Perceptions of Crop Science Instructional Materials

D. M. Elkins*

ABSTRACT

A number of crop science instructors have indicated that there is a shortage of quality, current crop/plant science teaching materials, particularly textbooks. A survey instrument was developed to solicit information from teachers about the use and adequacy of textbooks, laboratory manuals, and videotapes in crop/plant science instruction. Of 72 university instructors responding to a national survey, 72% required students to purchase a published textbook for the introductory crop/plant science course. Among instructors who used one of 12 different textbooks, 51% expressed some degree of dissatisfaction with the textbook, and 48% stated that textbooks currently available are not affordable for their students. Fourteen instructors assembled their own materials into a "textbook" package. Only 20% of the instructors required a published laboratory manual, while over 50% of the respondents either assembled materials into a packet or used handouts for their laboratory sections. Almost 65% of the instructors used videotapes, with more than 70% considering them important, very important, or essential in their teaching programs. About 50 instructors who used videotapes were almost unanimous in agreeing that a listing of agronomy-related videotapes available for purchase, rental, or loan would be useful.

In some instances, a textbook is the only instructional tool used by a teacher, and it can have a profound effect on student learning experiences (Ornstein, 1989). Due to the importance of textbooks in teaching/learning, agricultural educators should be concerned with selection of appropriate textbooks (Hitchner et al., 1992). Factors that should be considered are readability (Graveel and Fribourg, 1987; Hitchner et al., 1992) and updated information (Hershey, 1990). Karnok and Connors (1986) surveyed 49 U.S. land-grant universities about the beginning crop science course. Several subjects were explored, but no specific data on textbooks or laboratory manuals used by instructors were collected.

Some agronomists have commented that there is a current or impending problem as to availability of current crop/plant science teaching materials, particularly textbooks. The author is not aware of any major crop production or crop science textbooks published since 1980, although a few plant science books were published in the late 1980s (Barden et al., 1987; Hartmann et al., 1988). Some agronomy instructors consider plant science textbooks too botany-oriented, and too deficient in agronomic-crop information to meet their needs. While several crop/plant science laboratory manuals have been published in recent years, many have geographic or other limitations that reduce their usefulness. Many crop/plant science instructors at agricultural institutions develop or assemble their own teaching materials. Therefore, the problem of limited textbooks or related materials is likely more severe with teachers in smaller 4-yr or 2-yr agriculture programs. Many have heavy teaching loads or other obligations that restrict development of their own instructional packets.

More than a decade ago, the use of videotapes to supplement lecture and laboratory materials in various crop science courses proved to be an effective teaching technique (Burger and Seif, 1982). Videotaped instruction has been an effective delivery tool in agricultural safety training (Lehtola and Boyd, 1992). Other instructors have used videotapes as useful and positive supplements to bridge the knowledge gap between farm and nonfarm background students (Meisner et al., 1990) and to enhance lecture and laboratory material in a turfgrass management course (McCrimmon et al., 1992). While a number of agronomy-related, single-concept videotapes are available for purchase, rental, or free loan, the extent of their use in agronomy instruction and their value was not known.

Information is needed from teachers on the availability, use, and adequacy of textbooks, laboratory manuals, and videotapes in crop/plant science instruction.

MATERIALS AND METHODS

A four-part, 23-question survey was developed in the Southern Illinois University at Carbondale (SIUC) College of Agriculture to solicit information from instructors of introductory crop/plant science courses. This survey was designed to gather information on textbooks, laboratory manuals, and videotapes as related to the introductory course. In addition, a fourth section allowed open-ended comments.

College of Agriculture, Southern Illinois University, Carbondale, IL 62901-4416. Received 5 Nov. 1993. *Corresponding author.

Published in J. Nat. Resour. Life Sci. Educ. 23:129-131 (1994).

Abbreviations: SIUC, Southern Illinois University at Carbondale.

Table 1. Questions and number of responses pertaining to introductory crop/plant science textbooks.

a. Do you *require* a published textbook? Yes (52) No (20)

b. If yes, which textbook do you require?†

Textbook	*No. of respondents*
Barden et al., 1987, *Plant Science*	9
Hartmann et al., 1988, *Plant Science, Growth, Development, and Utilization of Cultivated Plants.*	7
Martin et al., 1976, *Principles of Field Crop Production*	6
Green et al., 1981, *Agronomy Principles and Practices*	5

c. Are you satisfied with this book? Yes (24) No (25)

d. Do you consider that the published textbooks are affordable? Yes (36) No (33)

e. What textbook price range do you consider to be *reasonable* and *affordable*?
<$25 (7) $26-$35 (32) $36-45 (28) $46-55 (3) $56-$70 (0)

f. If no textbook is required, do you assemble materials into a packet? Yes (74) No (22)

g. If no textbook or packets are required, do you place reference books/materials on reserve? Yes (25) No (22)

h. If you reserve materials, what are the three most important books?‡

Textbook	*No. of respondents*
Martin et al., 1976, *Principles of Field Crop Production.*	8
Metcalfe and Elkins, 1980, *Crop Production, Principles, and Practices.*	3
Hartmann et al., 1988, *Plant Science, Growth, Development, and Utilization of Cultivated Plants.*	3

† Seven others mentioned one or two times.
‡ Nineteen others mentioned one or two times.

Table 2. Questions and number of responses pertaining to introductory crop/plant science lab manuals.

a. Do you *require* a published laboratory manual? Yes (12) No (49)

b. If yes, which laboratory manual do you require? One manual mentioned two times, and five mentioned one time each.

c. Do you consider that the published laboratory manuals are affordable? Yes (24) No (6)

d. What laboratory manual price range do you consider to be *reasonable* and *affordable*?
<$10 (11) $11-$15 (26) $16-25 (12) $21-25 (4) $26-$30 (0)

e. If no laboratory manual is used, do you assemble materials into a packet? Yes (40) No (7)

f. If no laboratory manual or packets are used, do you place reference books/materials on reserve? Yes (8) No (5)

g. If you reserve materials, what are the three most important books/laboratory manuals? Seven mentioned only one time each.

The survey form, along with a cover letter and return envelope, was sent to 112 universities throughout the USA in January of 1992. The mailing list consisted of 67 land-grant universities, including 22, 1890 schools, as well as 45 non-land-grant institutions. The mailing was addressed to either the agronomy department head, chair of department/division of agriculture, or a specific crop/plant science instructor (if known). Department heads or chairs were asked to pass the material to the appropriate instructor and assist in facilitating completion of the survey.

No follow-up mailing was made. The identity of persons completing the survey remained confidential in accordance with requirements of SIUC's Committee on Research Activities involving Human Subjects, unless individuals chose to identify themselves.

RESULTS AND DISCUSSION

Textbooks

A total of 72 completed surveys were returned, for a return percentage of just over 64%. Fifty-two respondents (72%) indicated that they required a published textbook (Table 1). Of those using textbooks, 17% used *Plant Science* by Barden et al. (1987); 13% had adopted *Plant Science Growth, Development, and Utilization of Cultivated Plants*, second edition, by Hartmann et al. (1988); 12% required *Principles of Field Crop Production*, third edition, by Martin et al. (1976); and 7% used *Agronomy Principles and Practices* by Green et al. (1981). Seven other books were mentioned a fewer number of times. Of 49 respondents to the question, "Are you satisfied with this book?" 51% expressed some degree of dissatisfaction. Only 52% of 69 respondents indicated that they considered the currently available published textbooks reasonable and affordable for the majority of their students. Among 70 respondents, the larger percentage (46%) thought a $26 to $35 price was reasonable and affordable, whereas 40% believed a $36 to $45 range was acceptable. Only 10% of the respondents believed a book should be less than $25, and 4% believed students could pay $46 to $55. Thirty-nine percent of the respondents indicated they used no textbooks but assembled materials into a packet, while 53% placed books or other materials on reserve for their students. The three most frequently used reserve books were *Principles of Field Crop Production*, third edition, by Martin et al. (32% of respondents who used reserve materials); *Crop Production Principles and Practices*, fourth edition by Metcalfe and Elkins (12%); and *Plant Science Growth, Development, and Utilization of Cultivated Plants*, second edition, by Hartmann et al. (12%). Nineteen other books were mentioned one or two times (several respondents listed multiple books).

Laboratory Manuals

Sixty-one instructors responded to the laboratory manual questions, with only 20% indicating that they used a published laboratory manual in their class (Table 2). No major laboratory manuals surfaced as being adopted widely. Most individuals (80%) who answered the questions about affordability indicated that published laboratory manuals are in the proper price range for their students, in contrast to a more negative response regarding textbook prices. Of 53 respondents, 49% felt that $11 to $15 was the most appropriate price range, while 23% thought it was $16 to $20, and 21% believed it should be less than $10. Only about 7% found a $21 to $25 price range appropriate. Over 85% of the respondents indicated that they assembled materials into a packet for use by students; in addition, eight respondents placed reference books, manuals, or other materials on reserve for the laboratory portion of the course.

Table 3. Questions and number of responses pertaining to introductory crop/plant science videotapes.

a. Do you use one or more videotapes in course? Yes (44) No (24)

b. If you use videotapes, how many do you use?
1 or 2 (18) 3 or 4 (18) 5 or 6 (8) 7-10 (2) >10 (0)

c. If you use videotapes, how important are they to the objectives of the couse? Essential (4) Very important (14) Important (16) Minimally important (14)

d. If you use videotapes, what are the five most important titles (areas)?†

Videotape area	*No. of respondents*
Pest control	9
Biotechnology	8
Tillage	4
Irrigation	4

e. If you use videotapes, would a list available for purchase, rental, or loan be useful to you? Yes (56) No (1)

f. If you feel a list would be useful, how would you rate the usefulness/value of a videotape list?
Essential (4) Very useful (36) Useful (11) Minimally useful (1)

g. If you use videotapes, how do your students view them?
Video projection (10) Video player (39) Self-instruction (7) Other (1)

† Ninety-six other areas mentioned one to three times.

Videotapes

Among 68 respondents, nearly 65% indicated they used one or more videotapes in the introductory crop/plant science course (Table 3). Seventy-eight percent used four or fewer videotapes in each course, while the remaining 22% used 5 to 10. About 71% of those who used videotapes indicated they were important, very important, or essential in meeting the objectives of the course. The most important subject areas addressed with videotapes were pest control, biotechnology, tillage, and irrigation. Ninety-six other subject areas were mentioned one to three times. Ninety-eight percent of the respondents indicated that a videotape listing would be useful. In a rating of the usefulness/value of a videotape listing, 91% of the respondents felt that it would be useful, very useful, or essential, with the largest percentage (71%) stating *very useful*. Almost 70% of the instructors indicated that their students view tapes on a video player, with about 18% using video projection, and 12% using a self-instruction format.

CONCLUSIONS

1. There appears to be widespread concern and dissatisfaction among instructors regarding the introductory crop/plant science textbook situation. Survey data, as well as comments from respondents, indicated that many individuals are unhappy with the availability and affordability of appropriate crop science-production textbooks. A substantial number of instructors have chosen to assemble their own packets or use reserve materials in lieu of a textbook.
2. Less concern exists among respondents as to availability and costs of laboratory manuals. In fact, only a limited number used a published manual, and most assembled laboratory materials into a packet for their students.
3. The majority of respondents used videotapes in their introductory classes, with most indicating that tapes are an important component of the course. Survey participants were almost unanimous in their view of the usefulness of a listing of agronomy videotapes available for purchase, loan, or rental. The author recommends that such a list be compiled and published for the benefit of instructors who use videotapes in their classes.

REFERENCES

Barden, J.A., R.G. Halfacre, and D.J. Parrish. 1987. Plant science. McGraw-Hill Book Co., New York.

Burger, A.W., and R.D. Seif. 1982. Student reaction to color video tapes in crop science teaching. J. Agron. Educ. 11:10-12.

Graveel, J.G., and H.A. Fribourg. 1987. Using reading grade level to assess readability of selected plant and soil science textbooks. J. Agron. Educ. 16:24-29.

Green, D.E., D.G. Woolley, and R.E. Mullen. 1981. Agronomy principles and practices. Burgess Publ. Co., Minneapolis, MN.

Hartmann, H.T., A.M. Kofranek, V.E. Rubatzky, and W.J. Flocker. 1988. Plant science growth, development, and utilization of cultivated plants. 2nd ed. Prentice-Hall, Englewood Cliffs, NJ.

Hershey, D.R. 1990. VIntage plant science textbook data need updating. J. Agron. Educ. 19:198-199.

Hitchner, M.G., D.M. Johnson, and J.P. Deeds. 1992. Readability of required undergraduate agriculture textbooks. NACTA J. 36:40-41.

Karnok, K.J., and K.L. Connors. 1986. A survey of beginning crop science courses at 49 U.S. universities: 1. Lecture format, teaching methods, and topical content. J. Agron. Educ. 15:56-59.

Lehtola, C.J., and M.M. Boyd. 1992. An effective strategy in agricultural safety training. NACTA J. 36:31-34.

Martin, J.H., W.H. Leonard, and D.L. Stamp. 1976. Principles of field crop production. 3rd ed. Macmillan Publ. Co., New York.

McCrimmon, J.N., K.J. Karnok, and C.A. Meisner. 1992. Using videotapes to supplement lecture and laboratory material in a turfgrass management course. J. Nat. Resour. Life Sci. Educ. 21:129-132.

Meisner, C.A., K.J. Karnok, and J.M. McCrimmon. 1990. Can the use of a video tutorial bridge the knowledge gap between farm and nonfarm background agricultural students? J. Agron. Educ. 19:178-180.

Metcalfe, D.S., and D.M. Elkins. 1980. Crop production principles and practices. 4th ed. Macmillan Publ. Co., New York.

Ornstein, A.C. 1989. Textbook instruction: Processes and strategies for selection, use. NASSP Bull. 73:105-111.■