Journal of the American Association of Teacher Educators in Agriculture
Volume 16, Number 3, pp.8-12
DOI: 10.5032/jaatea.1975.03008

COMPETENCIES IN ENTOMOLOGY NEEDED BY AGRIBUSINESS TEACHERS AND EXTENSION AGENTS IN INDIANA

William H. Hamilton
Leon Walker

Agricultural Education
Purdue University

At the present time agribusiness teachers and extension graduates from Purdue University are required to take only one basic course in entomology in the undergraduate training. The majority do take two or more courses and a few who graduated many years ago did not take any entomology coursework.

Does the present curriculum requirement of only one course serve to meet the real need for entomological skills of these two groups? Is the single course that is taken structured in such a way as to provide agents and teachers with the kind and amount of knowledge needed on the job? And if the entomology course taken needs to be improved to better equip these agricultural workers, in what ways does this need to be done? It was these questions which motivated the undertaking of this research.

Following consultation with members of the Agricultural Education staff at Purdue University a panel of six expert agribusiness teachers and six extension agents was selected to identify the competencies in entomology most needed by these groups. In subsequent interviews a panel of experts was selected. Each member of the panel was visited by the researcher and asked to discuss the outstanding problems of an entomological nature which he had encountered in his job.

These comments, and those from a follow-up letter to each panel member, were summarized, edited to eliminate duplication, and prepared in questionnaire form. The instrument as completed consisted of two parts, a series of general information questions and the list of entomological competency ratings. A five-point scale was used by all respondents in ranking the degree of competency in entomology needed and possessed in thirty-three different categories of understandings and forty of specific abilities.

The completed questionnaire was sent to every extension agent and agribusiness teacher in the state. A second mailing was made one month later to those who had not responded to the first. A third mailing was made one month following the second. A total of 84.2% of agents and 61.7% of teachers responded to the questionnaire.

Information obtained from the mailings was compiled and coded by the researcher, and then keypunched into IBM cards for data processing. Independent variables used to describe each respondent within each population were: his age, number of years experience on the job, the number of entomology courses taken, his undergraduate major and whether or not he held the Master's Degree.

Mean scores and frequency distributions were determined for all general information questions and competency ratings. Major hypotheses were tested using the Students t test and the Mann-Whitney U Test was used to determine significant differences in competency scores between groups of unequal size. The final step in analysis was a factor analysis of the 73 categories of competency ratings.

Both professional groups rated their competencies needed higher than those competencies that they possessed. The entomological skill needs of both groups were found to be similar, but each group rated certain individual competencies as more important than others. Extension agents rated their competencies possessed higher than did teachers. Teachers rated the following competencies to be much more needed than possessed: ability to know where to get help in answering insect problems, ability to read and understand insecticide labels, understanding of terms like "fly-free date", ability to explain the need for insecticides and understanding of how insects travel and disperse. The highest mean needed scores for extension agents were obtained with the competencies of: ability to recognize insect damage, ability to evaluate insect reports and the ability to identify specific insects affecting crops.

The effect of the six independent variables upon mean needed responses of agribusiness teachers and extension agents were tested and the results are shown in Table 1.

Table 1. Summary of Significance Tests of Independent Variables. Calculated t Values for Differences Between Means of Needed Responses.

Variable	Groups Tested	d.f.	t	In Favor Of
1. AGE	Teachers 22-34 vs. teachers of other ages	156	2.21*	22-34
	Teachers 35-49 vs. other ages	156	.52	N.S.
	Teachers 50-65 vs. other ages	156	.38	N.S.
	Agents 22-34 vs. agents of other ages	89	1.98*	22-34
	Agents 35-49 vs. other ages	89	2.29*	35-49
	Agents 50-65 vs. other agents	89	.68	N.S.
	Teachers 22-34 vs. agents of same age	103	1.28	N.S.
	Teachers 35-49 vs. agents of same age	82	1.99*	N.S.
	Teachers 50-65 vs. agents of same age	58	.39	N.S.

Variable	Groups Tested	d.f.	t	In Favor Of
2. Years Of Experience	Teachers vs. agents, 1-5 years	62	3.76**	Agents
	Teachers vs. agents, 6-10 years	33	1.36	N.S.
	Teachers vs. agents, 11-20 years	73	2.65**	Agents
	Teachers vs. agents, 21-28 years	49	2.13*	Agents
	Teachers vs. agents, 29-43 years	22	.66	N.S.
3. Number Of Entomology Courses	Teachers vs. agents, no courses	61	4.28**	Teachers
	Teachers vs. agents, one course	156	1.99*	Agents
	Teachers vs. agents, two or more courses	26	.87	N.S.
4. Undergraduate Major Field	Teachers vs. agents, Ag. Ed.	180	.91	N.S.
	Teachers vs. agents, other	65	.43	N.S.
	Teachers in Ag. Ed. vs. teacher in other fields	156	1.03	N.S.
	Agents in Ag. Ed. vs. agents in other fields	89	1.10	N.S.
5. Masters Degree	Teachers vs. agents, with M.S.	151	.67	N.S.
	Teachers vs. agents, without M.S.	94	.84	N.S.
	Teachers with vs. teacher without M.S.	156	.90	N.S.
	Agents with vs. agents without M.S.	89	.85	N.S.
6. Degree of Help of Entomology Courses	Teachers vs. agents, positive	185	.49	N.S.
	Teachers vs. agents, negative	60	2.12*	Agents
	Teachers positive vs. teachers negative	156	3.19**	Positive
	Agents positive vs. agents negative	89	.07	N.S.

* = .05
** = .01
*** = .001
N.S. = Non Significant

The youngest workers in both groups, ages 22 to 34 years, were found to have greater needs than older workers. Extension agents aged 22 to 49 years had different needs than older agents. Competencies found to be of significant need for teachers in the age grouping of 22 to 34 years related to skills in understanding insect damage, insecticides, economic considerations, terms, insect surveys, morphology and ecological relationships involving insects.

In comparing teachers and agents by years of experience the t-test revealed that entomological competency needs were significantly greater for agents than teachers in the categories of one to five years, eleven to twenty years and twenty-one to twenty-eight years.

Area of undergraduate major and the holding of a Master's Degree had no effect on competency needs of either group. Extension agents who viewed their entomology course background as less than adequate had greater competency needs than those who considered their background adequate.

Extension agents were found to solve their insect problems in a different manner than did teachers. Both groups indicated that entomology courses should stress the topics of insect classification, followed by insect control and basic biology. A high percentage of respondents recommended that more than one entomology course be required in the undergraduate program of prospective agents and teachers.

Factor analysis isolated seven factors which could be used as a basis for organizing courses of instruction for these groups. These factors related to clusters of competencies in the areas of: insect classification, ecological considerations, the understanding of basic entomology skills, making and using insect collections, the use of insecticides, interpretative skills and judgment in the use of insecticides.

Analysis of the data from this study leads to the following conclusions regarding the entomological competency needs of Indiana agribusiness teachers and extension agents:

1. Entomological competencies are needed by both agribusiness teachers and extension agents.

2. Entomological competency needs are similar for both groups, despite certain individual competencies being viewed as more important than others for each group.

3. Both groups feel a greater need for entomological competency than that actually possessed.

4. Extension agents tend to rate their competencies possessed as slightly higher than do agribusiness teachers.

5. The youngest members of both professions, ages 22 to 34, show greater competency needs than do older workers.

6. The entomological competency needs of extension agents in the age categories of 22 to 34 years and 35 to 49 years differ from those of older agents.

7. Competency needs of both groups change over time, the changes in intensity of need being more evident for agents than teachers.

8. Beginning agribusiness teachers without a course background in entomology are at a greater disadvantage in their jobs than similar agents, but agents who have had one course in entomology perceive their need for further competency as being greater than similar teachers.

9. Area of undergraduate major field has no effect on the degree to which entomological competencies are needed by either group of workers.

10. Holding a Master's Degree had no effect on competency needs of either group.

11. Teachers and agents feel that entomology course instructional time should be devoted first to the topic of insect classification, followed by insect control, and finally to basic biology.

12. The common entomological competencies of both groups can be divided into seven factors as determined by factor analysis. These are: insect identification, ecological considerations, understanding of basic entomology skills, the making and using of insect collections, use of insecticides, interpretative skills and judgment in the use of insecticides.

The authors reason that results of this study indicate that the following recommendations should be made:

1. In-service training programs in entomology, geared especially to the needs of agribusiness teachers and extension agents, should be provided.

2. These in-service training programs should be based upon the seven factors of entomological competencies identified by this study.

3. The requiring of more than one entomology course in the undergraduate program of beginning agribusiness teachers and extension agents will be necessary if these workers are to enter their chosen careers with the degree of competence which they need.

4. Teachers of college entomology courses in which these workers commonly enroll should devote a greater portion of instructional time to the topic of insect identification.

5. Further research of factor analytical nature should be conducted to extend this investigation to workers in other states.