Pesticide Use in the 1983 Soybean Crop: Report of a Survey of Arkansas Producers

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DICOTYLEDONEAE (Dicotyledons)
Caryophyllaceae (Pink Family)
*Cerastium semidecandrum* L.


*Dianthus deltoides* L.
Clay Co., railroad dump in Piggott. D. M. Hughes, 26; June 19, 1965. T20N, R8E, S10. Flowers pedicellate. Closest species is *Dianthus armeria* L. This plant is cited here as new to the state.

*Lychnis coronaria* (L.) Desr.
Cross Co., edge of woods and in roadside ditch. E. L. Richards, 8202; August 26, 1984. T8N, R4E, S18. Plant parts tomentose. Closest related species is *Lychnis alba* Mill. This plant is cited here as new to the state.

Plantaginaceae (Plantain Family)
*Plantago cordata* Lam.


LITERATURE CITED


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REPORT OF A SURVEY OF ARKANSAS PRODUCERS

The use of pesticides in agricultural crops has increased significantly in the past decade. Use of these chemicals is considered essential by agricultural producers to maintain a high level of crop production and quality. Farmers and non-farmers are concerned about the impact these products may have on the environment.

In response to the need for information to address both viewpoints, the U.S. Department of Agriculture established the National Agricultural Pesticide Impact Assessment Program (NAPIAP) in 1976. One of the primary objectives of NAPIAP is to conduct pesticide use surveys on economically important commodities in the state in order to promote informed decisions on pesticides that significantly benefit humans without causing unreasonable adverse effects on the environment.

Soybeans were selected as the first major commodity in which to survey pesticide use in Arkansas since they are grown on more land than any other crop (Crop and Livestock Reporting Service, 1984). The primary objective of the survey was to determine which pesticides were used in soybeans and how they were applied. Data on soybean production practices that affect the use of pesticides were also collected including irrigation, soil types, and crop rotation. This report focuses on pesticide use in soybeans. Results of the entire survey will be available in an Extension publication at a later date.

This survey, with only minor changes, was conducted following the methods described by Dillman (1978) and Christensen (1975). Names of five hundred soybean producers were randomly selected (Leedy, 1980) from County Extension mailing lists. The number of producers selected from each county was in direct proportion to the county's soybean acreage in 1983 (Crop and Livestock Reporting Service, 1984). The number of producers surveyed exceeded the sample size recommended by Krijcile and Morgan (1970).

The 12-page questionnaires contained 37 questions and were printed in a small page (8 1/2" x 6") format (Dillman, 1978). They were mailed to producers on July 9, 1984, from the appropriate county Extension office. A postcard reminder was mailed to those producers who had not responded within the first week. When necessary, additional reminders (each containing a questionnaire) were sent after two and seven weeks had elapsed.

Questionnaires were returned to the state Extension office in business reply envelopes included with each mailout. Summaries of the data were made by State Extension Office personnel. A copy of the questionnaire is available from the author.

Producers returned 436 of the 500 questionnaires mailed out for an 87 percent return rate. Of the 436 returned, 399 completed all or part of the questionnaire. The remainder either had not planted soybeans in 1983 or chose not to answer the questionnaire. Those producers responding grew soybeans on 308,894 acres in 1983 which represents 8.1 percent of the soybeans planted that year (Crop and Livestock Reporting Service, 1984).
Herbicides represented, by far, the most used pesticides in soybeans and were applied at least once to 92.2 percent of the acreage surveyed. Use of pesticides in the remaining categories was considerably less (Table 1).

Pesticides used by producers in 1983 before the soybeans emerged from the soil were predominantly herbicides (Table 2). The dinitroaniline herbicides were used on 66 percent of the treated acres and the acetamide herbicides on 16 percent. Both of these herbicide types are applied primarily for annual grass control. Trifluralin was the most-commonly used grass herbicide and was applied to more than one-third of the acreage surveyed.

Metribuzin, a triazine herbicide, had the second highest use rate prior to soybean emergence. It was either applied alone or in a tank-mix combination with one of the dinitroaniline or acetamide herbicides.

Other herbicides used on any significant acreage at the pre-emergent stage included glyphosate and dinoseb. The remainder of the pesticides was used on less than five percent of the total soybean acreage surveyed and none were applied to more than one percent of the treated cropland.

Most of the dinitroaniline herbicides used were applied (with a disc, cultivator, or other implement) while only half of the acetamides were applied this way. The remainder was applied at planting.

Aerial application of pesticides had limited use at the pre-emergent stage. Commercial applicators (air and ground) were utilized by producers to apply less than 15 percent of all pesticides used up to this point in soybean production.
Fungicides were used to treat soybean seed at planting time on 65.6 percent of the acres surveyed. The treatments were either liquid or dust formulations and were applied prior to bagging the seed or in the planter hopperbox. Captain was used on 30.1% of the acres surveyed followed by carboxin (22.1%), pentachloronitrobenzene (PCNB) (9.8%), terazole (9.3%), and thiram (7.9%). Several seed treatments available contain more than one fungicide as an active ingredient and, therefore, the above data are not additive.

The greatest use of pesticides in 1983 crop occurred between soybean emergence and harvest. This is not surprising since weeds, diseases and insects that reduce soybean yields have their greatest impact at this time.

Once again, herbicides were used over a much larger acreage than either fungicides or insecticides (Table 3). Bentazon and acifluorfen were the most commonly used herbicides followed distantly by 2,4-DB. These products are applied to control the major broadleaf-weed pests in soybeans, primarily cocklebur and various morningglory species.

Fungicides were used on only about 6 percent of the acreage and insecticides on even less (1.9 percent). The extremely hot and dry weather experienced in the 1983 crop season was certainly a factor in the use of fungicides since moisture levels for development of these pathogens in the soil and the soybean canopy were greatly reduced in most fields. Further, insects do not normally have a large impact on soybean yields statewide and, therefore, low insecticide use was to be expected.

The majority of the herbicides was applied by the producers themselves with ground equipment rather than by airplane. Consequently, use of commercial applicators was infrequent.

Since we were also concerned about the major pest problems the producers had in 1983, we asked, "What do you consider to be the most damaging pest in your soybeans?" Table 4 presents the producers' top five responses in the categories of weeds, diseases, and insects. The responses correspond well with the pesticides used in 1983 for control of those pests.

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LITERATURE CITED


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