

tion costs by this method at one-half to one cent per bushel.

Fairfield Chemical Division, Food Machinery and Chemical Corp., announced this spring new oil-free emulsion sprays for stored grain protection. These sprays are formulations of pyrethrins and piperonyl butoxide. Fairfields W. E. Dove reported during the Cincinnati ACS meeting field tests using a standard concentration of 2% piperonyl butoxide and 0.2% pyrethrins in oil-free emulsion. Satisfactory results were obtained using 5 gallons per 1000 bushels of grain.

War on the Khapra Beetle

More than thirty species of insects are known to attack stored grain. The latest one to appear in the United States is the khapra beetle. To fight this newest pest, what is believed to be the largest grain storage building fumigation program is now under way in California, Arizona and New Mexico. Methyl bromide gas has already been used for this purpose in 15 large California warehouses. It was in Tulare County, Calif., that the khapra beetle was first found in 1953.

In an elaborate test in January the beetle was eradicated from a large warehouse at Imperial, Calif., using 2½ times the methyl bromide dosage and 12 times the exposure duration normally required for the exposed khapra beetle (see also AG AND FOOD, March, 1955, page 192).

Since then, cooperating states and operators of warehouses concerned have borne the cost of eradication with assistance from the USDA. Some warehouses yet to be fumigated contain as much as 6 million cubic feet of space; some have stacks or tanks rising 135 feet. Khapra beetles have been found by control workers in warehouses 21 feet deep under solid masses of grain and crawling on bags of insecticides. They have worked their way through a two-foot brick warehouse wall.

Under quarantine against the beetle as of April 30 were 116 locations in California, 52 in Arizona, and 4 in New Mexico. USDA officials expect infested warehouses in New Mexico to be cleaned up almost immediately. A second survey of farm storage facilities in suspected areas is under way. Surveys by Agricultural Research Service workers cooperating with state departments of agriculture have been made in parts of Texas and Louisiana, and are now under way in Colorado. They will be extended to other states.

Irradiation Possibility

Preliminary designs of possible equipment for irradiating grain have been worked out by American Machine and Foundry Co. It has been established

that radiation will kill or make sterile insect pests in grain. AM&F's William E. Chamberlain says that his company's preliminary studies indicate that radiation meets the requirements of the ideal de-infestation system: low cost, effectiveness, and flexibility of application.

Preliminary designs include both mobile and semi-mobile crop irradiators for grains. The mobile irradiator might be built into a railroad car for treatment of grain at the elevator. The semi-mobile or fixed unit is designed for use permanently within a grain elevator. The mobile crop irradiator for grains includes a dehumidifier-separator which simultaneously dries the grain and segregates insects and other foreign objects.

Irradiation can't be considered a solution in the near future because general acceptance must await long term tests on the effect of this type of treatment on food products. At a recent meeting at Brookhaven an official of the FDA offered his personal opinion that it would take from 5 to 15 years to accumulate enough data to establish beyond reasonable doubt the safety of consuming irradiated food crops.

Future Market for Stored Crop Protection Chemicals

The volume of grain fumigants sold in recent years has been approximately three million gallons. How high this is going in the next few years seems to be debatable. A conservative estimate forecasts an increase of one third in the immediate future. One midwestern distributor anticipates that the market for grain sanitation products, fumigants, and residual sprays will double within the next two years.

Losses caused by infestation of stored grains are serious. Some estimates place this annual loss as high as 150 million bushels. There is a rich reward awaiting the chemical manufacturer who can develop and sell *the farmer* on a highly

satisfactory product—one that will cut this loss with no damage to the grain and at the same time lend itself to easy and safe application.

Fertilizer Acceptance

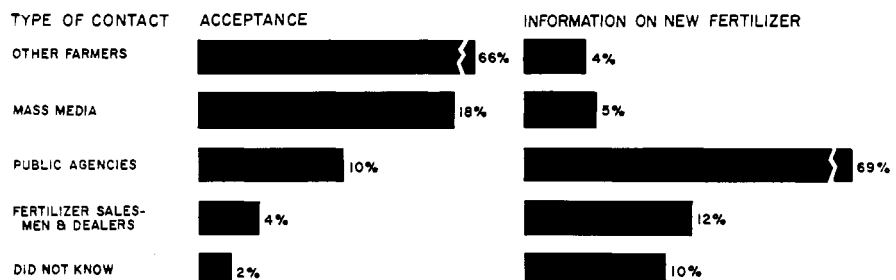
New fertilizer practices gain farmers' confidence most effectively through technical agencies' advice, according to Iowa findings

WHAT CAUSES a farmer to use modern fertilizer practices? What sources does a farmer use to get information on new fertilizers as they become available? These are the questions many a company would like to have answered; they are all important in designing a policy for successful marketing. These are also the questions that Iowa State College and the Tennessee Valley Authority set out to answer in 1953 survey of Iowa farmers.

Briefly, the most important findings of this survey are: other farmers, chiefly neighbors, are the most important source of information influencing the acceptance of fertilizer use; and Iowa farmers go to the State College and other public agencies to learn about a new fertilizer.

In making their survey, Iowa State people interviewed 532 farmers. They used a random sampling technique designed by the ISC Statistical Laboratory in such a way that every farm within the population had an equal chance of being selected. Personnel from the Statistical Laboratory conducted the interviews, and members of ISC's agronomy, sta-

Comparison of sources responsible for the first use of fertilizer (on the left) and sources used to secure information on a new fertilizer (on the right). Over half of the farmers credit neighbors, friends, and other farmers as the most important causative factor in their adoption of fertilizer. This does not preclude the possibility that they had information from other sources, but it does reflect the important contact or medium which they recalled in arriving at their decision. By far, the largest number of farmers seek out public agencies for information on a new fertilizer



	USERS	NONUSERS	ALL FARMERS
Characteristics			
Number in sample	365	167	532
Average size farm (acres)	204	165	192
% owners or part-owners	56	56	56
% renters	44	44	44
Average owned capital (dollars) ^a	31,751	19,807	28,002
Average age of operator	43	49	45
Average years farming experience	18	22	19
Education			
% grade school only	48	64	53
% some high school	45	34	42
% some college	7	3	6
% Believed Fertilizer Has:			
Beneficial effect	87	63	80
Harmful effect	4	10	6
Effect not known	8	27	14

^a Owned capital is the cash value of the farm (if owned), livestock, feed supplies, machinery and equipment minus any mortgage or indebtedness.

This table from the Iowa study shows that a fertilizer user can in general be characterized as having more capital, a larger farm, more education, and fewer years of experience than the nonuser. He is also younger. Whether he owns the farm or not makes no difference

tistics, and economics department, along with TVA's agricultural relations division, prepared the questionnaire and analyzed the data.

In their report, which became available recently, the causative factors involved in acceptance of a practice are placed in four groups—mass media (newspapers, radio, TV, and magazines), agricultural agencies (extension service, state colleges, county agents, and others), neighbors and friends, and salesmen. The report also lists four stages in the farmer's acceptance: awareness, interest, trial, and acceptance. In creating awareness and interest, mass media ranked first in importance and agricultural agencies as second, with neighbors third. In trial and acceptance, neighbors move up to first place in importance, with agricultural agencies remaining in second place, and mass media moving into third. Salesmen ranked fourth throughout.

The firm second place through the four stages of acceptance held by agricultural agencies and the tremendous lead taken by them when it comes to information about a new fertilizer emphasizes the importance to fertilizer and agricultural chemical manufacturers of working through and with federal and state agricultural experts. This is a well recognized and widely practiced procedure.

The importance of neighbors and friends in clinching acceptance illustrates the importance of demonstrations and of identifying and selling the community leader—these are the steps necessary to start to get the ball rolling.

Farmers fall roughly into five different types in relation to their acceptance or nonacceptance of new practices: the innovators, the early adopters, the infor-

mal leaders, majority, and the non-adopters.

The innovator is the fellow who is usually knocking on the laboratory door to find out when a new practice will become available. Apt to be reckless in his driving desire to be "first," he is usually criticized by his neighbors. However, he usually does have high social and economic status in the community. Although not to be confused with the leader, he appears to be the first stop on the road from laboratory to farm acceptance.

The early adopter is characterized, educationally, socially, and economically with the innovator, the only difference being that he is somewhat more cautious in adopting new methods and is not possessed of the drive to be first. The innovator and the early adopter are seldom mentioned by farmers as a causative influence in practice adoption.

The informal leader is the next type to accept a new practice, and, although not elected or appointed to leadership, he has many followers in his neighborhood—he is the "average" farmer with average education and experience, has a medium social and economic position, and reads an average number of magazines and papers. When a new practice is accepted by the man, it is "over the hump," the next step being adoption by the majority, who are usually older and have less education than average. They read fewer magazines and newspapers and participate less in agency programs.

The nonadopters are differentiated from the majority by being somewhat older with less education, having relatively less social and economic position, and participating even less in farm organizations and agency groups.

Another trend that is suggested in this

report is the increasing importance of the fertilizer dealer and salesman. Only 4% of the farmers interviewed credited this group as the primary influence leading to acceptance of fertilizer use. However, 12% of the farmers indicate they would seek information on new fertilizers available from this group. Evidently farmers recognize that this is an era of rapid technological change in fertilizer and some of them expect fertilizer dealers and salesmen to have technical information and literature available.

Potash Market Faces New Era

Saskatchewan development could improve competitive position of North American producers in relation to European cartel

NORTH AMERICA may become a potash exporter within the next few years. The export future hinges on potential development of huge deposits in Canada. Investments are now being made for exploration and development with the aim of getting production in the near future. Canadian production when and if it comes in could be enough to wrest the balance of market control from the European potash cartel.

At this writing no potassium salts in commercial quantities have been recovered in Saskatchewan; still, four companies there are actively engaged in exploring what both American and Canadian potash interests call the largest, or next to the largest, reserve of these salts on the North American Continent.

The Saskatchewan potash is not as easily recoverable as the potassium ores in the Carlsbad, N. M., field. One company working the Canadian find, Campana, Ltd., has just been reported as striking a potash bed approximately 100 feet thick at the 3600-foot level near Wilkie, Sask. This may call for engineering and mining techniques not used heretofore in this industry.

By contrast, langbeinite ore has been reached in Carlsbad at the 800- and 850-foot levels, and sylvanite at 900 feet. Just what measures will be employed by the Saskatchewan companies to recover their salts and refine them profitably has not been disclosed in any detail thus far. In addition to Campana, Ltd., just mentioned, other firms active in the Canadian potash venture are the