

# 1958 PESTICIDES

## The East

Sales equal to or better than last year's. Wet weather held back insects, boosted fungi

**D**ESPITE business recession and a cool, damp spring and summer, eastern producers of pesticides report sales this year are at least as good as—and often better than—those of a year ago. The over-all picture is spotty, however. Wet weather this season retarded many insect populations, cutting demand for some insecticides. Moreover, last year's poor growing season left many farmers cautious about spending more money on farm chemicals.

On the other hand, growing conditions generally were more favorable in the East than they were last year, when hot, dry weather cut into pesticide sales. This year's excessive rainfall boosted demand for fungicides. Acceptance of relatively new products improved the sales picture. And exports were higher for many companies, helping to smooth out the usual sharp seasonal fluctuations in business. All in all, most companies probably would agree with one large manufacturer who states that "this will probably go down as a reasonably good year for the agricultural chemicals industry."

### Market Trends

The chief trends in marketing, according to one company, point to more stabilization in the industry; good business management in controlling inventories and maintaining stable distribution patterns is more important than ever before. Another producer points to "cleaner" practices in the industry. Price cutting is said to be at least no worse than in the past. Buyers are more cost conscious, however, and hand-to-mouth purchasing more prevalent.

Stocks, for the most part, have been adequate but not excessive. Many firms have striven to keep inventories as low as possible. Shortages of pesticides, where they occurred, were temporary and did not hinder farmers' pest control programs. Tox-

1958 was a year of field trials for many new products such as this trial in New York state



# SEASON

aphene was in short supply during periods of heaviest use, but stepped-up production should prevent a recurrence of shortages in the future. Hercules Powder notes a "tremendous" increase in sales of toxaphene this year.

Demand for DDT has been strong, partly because of greater exports. Prices were firm, as a result, and supplies fairly tight. Benzene hexachloride (BHC) also was in good demand, with prices firmer in the latter part of the season. BHC supplies were ample, however.

## Weather Sets the Stage

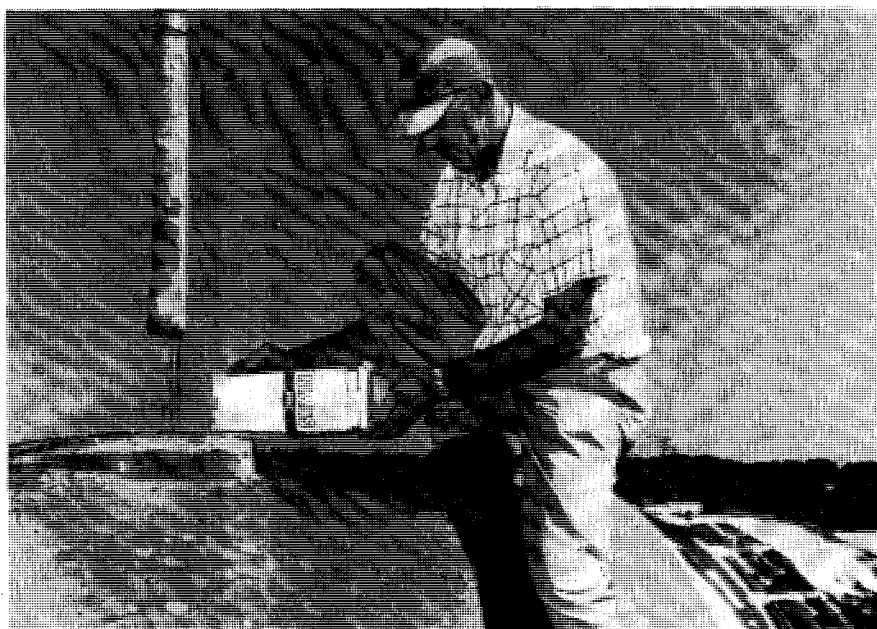
Wet weather during the spring delayed use of some pesticides and, because of a shorter planting period, curtailed use of other agricultural chemicals that could not be applied at the time of planting. Insects frequently were less of a problem, with aphids showing up as one of the worst pests during the season.

A number of specific conditions affected the market picture. Fruit crops, especially, required more care as a result of heavy rainfall. Increased use of fungicides was required during the period of primary apple scab infection, and over the entire season for control of brown rot on stone fruits. Favorable conditions for apple maggot flies and frequent rains made repeated spray or dust applications necessary on apples in Massachusetts. Powdery mildew of apples was considerably more severe in New York than it was last year, although standard control with sulfur in pre-bloom sprays and Karathane in post-bloom sprays provided good results.

Wet weather also affected truck farmers. Ideal conditions for development of the onion maggot led to unprecedented use of insecticides on onions in Massachusetts. Abnormal weather also favored development of such diseases as late blight on potatoes and downy mildew of lima beans in the Northeast.

In Pennsylvania, alfalfa weevil infestations were heavier, with the insect noticed in some new areas for the first time. Red-banded leaf roller and codling moth were more abundant than usual, also. More extensive spraying of hay crops this year helped boost demand in the Middle Atlantic area.

Wet weather probably was the reason for greater interest in pre-emergence herbicides, as abundant



Among new products widely tested this summer was Union Carbide's Sevin, which proved effective against Mexican bean beetles in New York

rainfall stimulated weed growth. In the East, vegetable farms and nurseries probably are the biggest markets. Relatively large amounts of simazine were used for weed control in sweet corn. One producer reports, however, that over-all growth in use of pre-emergence chemicals is slow, although steady.

Systemic insecticides continue to look promising to eastern farm experts. But general use seems to have increased little, if at all.

More demeton is being used for aphid and mite control on apples this year, according to Massachusetts authorities. Phosdrin has been used to some extent, also. In Pennsylvania, the largest application of systemics continues to be on greenhouse flowers.

No significant changes can be noticed in interest in biological pest control. Testing is under way in some areas. But main emphasis is in use of biological agents in conjunction with chemical pesticides rather than in place of them.

Antibiotics, although not fading from the scene, still have won no major place in eastern pesticide markets. Their high cost has been more than enough to outweigh any advantages, so far. Most observers feel that more research and more effective products are needed if antibiotics' potential is to be realized.

Talk of insect resistance to insecticides may be less noticeable this year, but opinion remains divided as to whether the problem is any less acute. Some experts think that reports of resistance are exaggerated. Others believe that more attention to proper application methods and the introduction of some new products

have effected a "cure." Nevertheless, many workers are still quite concerned about the appearance of resistant insect strains.

Use of more concentrated materials seems to be increasing this year. Custom spraying—either by professional operators or by one farmer spraying for himself and his neighbors—is also on the upswing. Two advantages result: farm equipment investment is kept at a minimum; the operator is better qualified than the average farmer.

## New Products

Producers continue to develop new chemicals and formulations for farm use. Delnav (formerly Hercules 528) saw its first broad-scale use this year, with "gratifying" results, according to Hercules Powder. Rohm & Haas says many potato growers are using maneb on part or all of their acreage in place of older nabam or copper sprays, because of greater convenience or better disease control. Kelthane, a new miticide, also has found wide use in eastern orchards, even though mites were not unusually severe. Diazinon was used extensively for the first time in Massachusetts to control codling moth, green aphid, apple maggot, and mites; results are promising. Guthion had extensive field testing there, with satisfactory results except possibly against the plum curculio.

Sevin, Union Carbide Chemical's new carbamate insecticide, underwent extensive field testing this season. It has controlled over 100 different insects on varied crops, including fruit, cotton, and vegetables. It has been effective for forest insect control, in addition. Carbide expects tests this sea-

son will lead to commercial marketing of Sevin next year as a 50% wettable powder for spray use and in formulated dusts. Another Carbide product, Mylone soil fumigant, has been registered for expanded use in seed and plant beds.

### **Miller Bill Ups Costs**

Eastern producers are agreed that the Miller Amendment to the Federal Food, Drug, and Cosmetic Act has made development of new chemicals more costly and more time consuming. One producer figures that the requirements of the amendment may add as much as 50% to the expense of bringing out a new product. R. H. Wellman of Union Carbide estimates that the cost of determining residues to comply with government regulations may well run to \$50,000 for a new fungicide. Toxicity work required by the act, Wellman adds, probably adds another \$50,000 to development costs. All this is on top of the price tag of over \$1,250,000 that Wellman puts on the research needed to carry a typical new fungicide through initial synthesis to successful development.

A spokesman for one company argues that the added time and money needed to comply with the amendment do not yield answers to basic questions of safety, but instead must be expended on study of marginal uses for farm chemicals and of "health hazards of very little consequence." Another firm feels that development work with some chemicals undoubtedly has been restricted, especially where the research investment may now outweigh potential profit in the light of possible tolerance restriction. But most firms look on the law as a "necessary evil." They think it is causing no great change in development work of established companies—though it might well discourage other firms from entering the field.

Government victory in the New York gypsy moth case aroused considerable interest in the East. Observers find the favorable decision of the court encouraging; if the verdict had gone the other way many large-scale control programs would have been jeopardized. On the other hand, many industry people expect more cases of this type will wind up in court. They point out that the case underscores the need for good public relations and strict attention to safety precautions.

In general, the verdict is not expected to result in any immediate change in spraying programs. Although it may reassure many people who had worried about possible effects of wide-spread use of insecticides, the

problems of potential contamination—of milk in particular—remain serious in the eyes of state officials.

### **Education Still a Need**

Better education of pesticide users remains of vital concern. Most manufacturers think the situation is improving, but they admit that much remains to be done. One producer fears that education to date has been more successful in persuading the farmer to use pesticides on his crops than in showing him how to handle such materials safely. "Haphazard use of toxic products is appalling," he adds. "It is probably a case of familiarity's breeding contempt."

One big job for industry and government authorities, another manufacturer says, is the development of "programs" to show farmers just when and where during the season to apply the many different chemicals available. Continuous work by experiment stations, county agents, manufacturers, and distributors is needed, too, to keep consumers informed of new materials and practices and to ensure that they use them properly. Still another producer suggests that state experiment stations and county agents themselves might benefit from more "education" in changing farm practices.

## **The Midwest**

**Cool weather held back insects, but over-all sales of pesticides were ahead of 1957 season**

**B**Y SEPTEMBER of the 1958 Midwest pesticide season it was clear that weather again was the guiding influence on what products sold where. The Soil Bank and generally improved farmer education may have helped sales, the Miller Amendment or new cases of insect resistance may have caused changes in use patterns, and new cultivating practices perhaps had some effect on application. But over all hung the heavy hand of Old Man Weather.

From Kentucky to Minnesota, from Ohio to Iowa, things have been cool and wet. But pesticide makers, at least in the Midwest, are quite satisfied with the way weather has affected business. It has been wet enough to produce a generous crop of weeds, and while the wet weather kept some farmers out of their fields at spray time, it was not wet enough to hurt herbicide sales seriously. Low temperatures helped to reduce the over-all insect population, and as a result reduced sales of insecticides. But to balance this there were local outbreaks, for instance grasshoppers

in Kansas, which helped to brighten the insecticide sales picture. Sales of granular DDT in Iowa for corn borer treatment were reported to be the highest since granular materials were introduced in that state.

The consensus in the Midwest is that 1958 will wind up as a better pesticide year than 1957. However, production can top last year's without setting any records, since last year registered a 10% drop from 1956. As in 1957, herbicides are doing better than insecticides in this area, helping to make up for reduced sales of the latter. Over-all outlook: '58 will beat '57 by 10%.

### **Consignments Out**

Since last season there have been substantial changes in marketing and distribution of pesticides in the Midwest. Most notable is the decrease in consignment selling, which puts an unjust inventory burden on the producer, and cuts into profit margins. The practice had spread widely during the past few years as a buyers' market in pesticides pushed manufacturers and formulators to be more and more competitive.

Consignment selling, of course, has not been wiped out completely. But it is much less in evidence this year as producers take a more realistic approach to marketing. Along with the sharp drop in consignments there are reports of less price cutting. And a larger portion of accounts receivable is being paid within the discount period. Monsanto, for instance, says that during the season's most active herbicide period over 80% of its sales dollars were received within the 20-day cash discount period.

These separate items collectively add up to better midwestern profits for the pesticide industry, even in a "recession year." Improvement is far from uniform; some still complain of the profit squeeze. But a majority of Midwest industry people say that profits are rising.

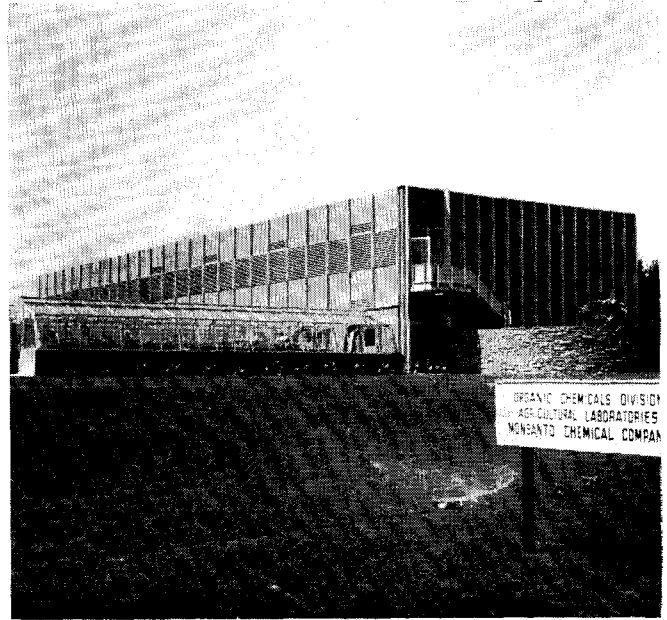
### **No Big Plagues**

No general insect infestations turned up in the Midwest this year. The closest thing to a plague was the grasshopper surge which touched Kansas. Fast control action warded off any lasting damage, and the principal effect of the hoppers was a nice piece of business for the makers of the insecticides used, mostly aldrin and dieldrin.

Other insect outbreaks were strictly local affairs. For example, in Ohio above normal quantities of spittlebugs, corn leaf aphids, and armyworms appeared. None, however, presented



R. B. Neiswander of Ohio State Agricultural Experiment Station tries a systemic on the soil for insecticide control



Monsanto's new agricultural chemicals research center near St. Louis was ready for occupancy this season

any serious threat to crops. Early application of heptachlor quashed the spittlebugs, and toxaphene and dieldrin were used on the armyworms. Malathion, applied mostly by air, was used against leaf aphids, although Ohio Experiment Station reports that the infestation subsided without causing much damage whether or not fields were treated.

Some 15,000 acres of southern Illinois corn were destroyed by black cutworms. Treatment with dieldrin and toxaphene was effective where used. In North Dakota, the major bug problem was sugar beet webworm which hit sugar beets, potatoes, soybeans, flax, and in one instance, wheat. Kansas was bothered by cutworms and chinch bugs in addition to its grasshoppers. The corn borer, ever-present Midwest pest, was around as usual but caused no more trouble than expected. Nebraska was one of the harder hit states, but got good results against the borer with granular DDT. A successful fight against Japanese beetles was waged in Kentucky; after an early infestation and treatment with air-applied dieldrin, none could be found during the adult beetle season.

#### **Pre-emergence Grows**

With the wet weather pushing up a thick crop of weeds, herbicides—particularly those used for pre-emergence treatment—have been quite active in the Midwest.

Comments about pre-emergence application of herbicides sound something like this: "... growing rapidly ... sharp sales increase ... rapidly in-

creased ... very encouraging ... ." Benefiting from this new interest in pre-emergence herbicides are products like Radox, Vegadex, and Simazin. And at the head of the heap is probably 2,4-D. Monsanto says it finds rapid farmer acceptance of Radox and Vegadex, and so far this year, sales of these items have "sharply increased." The trend to pre-emergence herbicides in the Midwest, according to most agronomists, can be explained by the fact that farmers are just now getting acquainted with the possibilities of such treatment.

Acceptance by farmers of pre-emergence compounds is perhaps the first fruit to be harvested from stepped up farmer education efforts of the past few years. Midwest experts this year say there is definite improvement in pesticide education. In the next breath, however, most add that there still is a huge job to be done. Many farmers still do not know how to use pesticides properly, a difficulty magnified by the ever-increasing line-up of chemicals available to the user.

#### **Resist Resistance**

Good news of a negative sort is found on the resistance scene. Although insect resistance to insecticides is considered no less serious than a year ago, no serious new cases have been reported in the Midwest. Opinion on what to expect in the future varies quite a bit; one man calls this season's quiet the lull before the storm and says widespread resistance problems are just around the corner. Others think that past resistance reports arose from cases of improper

application rather than true resistance, and that the whole resistance picture has been painted overly black. The truth probably lies somewhere in the middle. The "newness" has worn off the subject of resistance, but agronomists have no less interest than before, particularly from the research point of view.

In the wake of the New York gypsy moth case Midwest manufacturers regard possible future legal tangles with cautious optimism. A Michigan producer says that the bulk of the people concerned with insect problems now realize that the world's vast agricultural development has upset the balance of nature, and that good pest control programs are essential. Another industry man adds, however, that victory in the gypsy moth case by no means implies a victory in all similar cases in the future, and that unfavorable publicity about the case may spur other vociferous minority groups to take a belligerent stand.

Another industry problem, the cost of doing business under the Miller Pesticides Amendment, also provokes a wide range of comments. The cost of developing toxicity data to obtain an FDA tolerance runs anywhere from \$15,000 to well over \$100,000, according to Midwest estimates. Without doubt, then, the amendment adds to the expense of bringing out new compounds. One of the larger companies says that to date this extra cost has not had a deterring effect on its activities, but it certainly does get serious consideration prior to any decision to market a new pesticide. Another manufacturer says that the added cost has decreased the number of new ma-

terials introduced, and therefore has served to stabilize the industry as far as the distributor is concerned.

### **What's New**

Late in August Dow and Abbott Labs caused a flurry of excitement with news about a new chemical for treating Dutch elm disease. But when all the facts became known it was clear that neither company had a cure; at least not a proved cure. The chemical, its identity still undisclosed, was one that Abbott had screened for possible use in treating virus diseases of humans. A year ago Abbott turned the material over to Dow for further exploratory tests, and Dow now says that the compound "has shown some indication of control of Dutch elm disease." Dow adds that the product is not on the market, that it is purely experimental, and that any definite statement of success or failure is at least a year away.

A few new pesticides are under test this year in the Midwest. For instance Kentucky reports that Carbide's Sevin and Allied's Kepone are under test for insect control where resistance to chlorinated hydrocarbons and other phosphates has appeared. Phaltan, a new fungicide, is being tested in North Dakota for late blight on potatoes. Among herbicides, Radox and Simazin, although not brand new, are coming into much wider use this year.

Much of the test activity involves established products being tried for new uses. Illinois is running full scale tests on use of malathion to treat grain in storage. Results to date look promising, particularly on wheat. Also in Illinois parathion and Diazinon are coming into use for onion maggot control, and heptachlor was used this season on spittlebugs. In Ohio, Phosdrin is being used to control aphids and other pests on vegetable crops. In Kansas, dieldrin and DDT are taking a stab at bark beetle control.

Antibiotics are popular in the Midwest for a few specific uses, but have not entered any new areas during the past year. The future of antibiotics in agriculture is hard to pinpoint. Most experts seem to think that applications will boom if production costs can be cut.

## **The South**

**Weather, Soil Bank hurt sales. New materials testing stepped up—many results favorable**

**A** GAIN THIS YEAR, weather and the Soil Bank influenced pesticide sales most in the South. Weather in the form of the coldest winter in 30

years in some parts of the South, a wet and late spring—although not setting records as the winter did—and a relatively wet summer hurt sales volume almost throughout the South.

From several locations comes the comment that sales were off some 20% this year. Weighing the pluses, minuses, and evens, informed sources in the South estimate a 15% decline might be average. In a few places, Texas' Rio Grande Valley for one, sales were actually up slightly. In others, Florida for example, some of the newer pesticides sold better than in 1957. Among these was zineb, now that it may be used on citrus. Sulfur was the main pesticide replaced by zineb in Florida.

Southern profits generally looked even more dismal than sales. Where sales volume held up or increased slightly, profits were off just a bit. Where volumes declined, profits really dropped.

### **Weather Boon?**

In some ways, the cold, wet weather and late planting proved helpful to farmers and growers. The unusually hard freeze killed many hibernating insects, particularly boll weevils. The cold winter in Florida, while damaging vegetables and citrus, also reduced insects to unusually low levels. But the cold winter reduced demand for cotton insecticides as much as 40% in some areas. Insecticides for vegetable pests were also in smaller demand.

The late, wet spring assisted the cold winter in reducing cotton pest populations. Weevils that had not been frozen came out of hibernation only to find cotton up to a month late, and little to eat. Hence, says one entomologist, weather this year was the most effective weevil control available. Add to this a shorter growing season and it is easy to see why cotton pesticide sales were off.

At best, the Soil Bank can be said to increase the competition for sales of pesticides in planted areas. Going further, one manufacturer says land going into the Soil Bank cut pesticide demand as much as 90% in isolated areas. Another says the big change came last year, according to the record. But the effects were carried over this year, and the Soil Bank still represents a significant loss of sales.

Price cutting got a bit worse this year again, in the South. Organic phosphate insecticides as a group were cut the most. Indirect reduction took the form of increased freight allowances, looser and longer credit, and season-end takebacks for virtually all insecticides.

In some areas of the Southeast, paradoxically, a higher fraction of sales

were for cash this year. This practice made price competition more important than ever, with most of the burden thrown on manufacturers and generally not dealers and distributors.

Consignment selling is now considered common practice, says one individual. Another points out that it is in the South to stay—what with material supplies more than adequate, and acreage restrictions in force.

### **Supplies Everywhere Adequate**

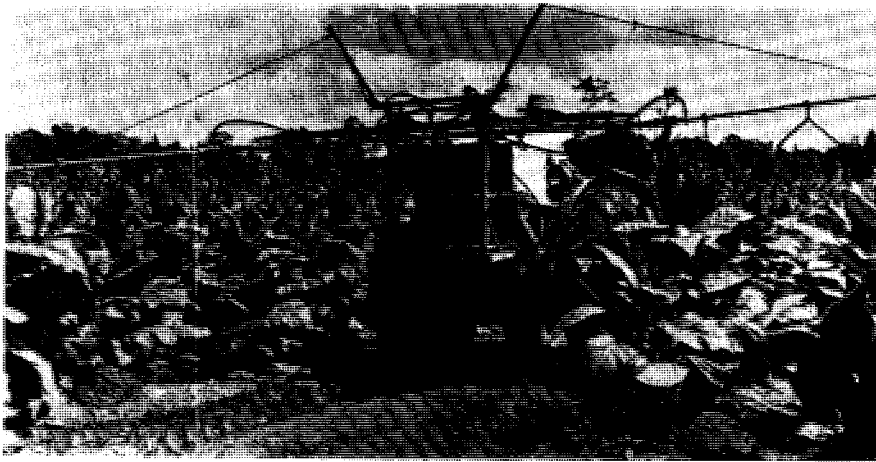
Manufacturers looked hard at their inventories of pesticides around the South and came closer to balancing demand and supply than in the past several years. Admittedly a few materials such as DDT and toxaphene proved tight—although still adequate—during brief periods of heavy demand. Government buying of DDT made it short in one area for a time, although no one had any difficulty in protecting crops.

Generally, production of pesticides was very well adjusted to demand, say several producers. There were no significantly large inventory build-ups reported, except possibly in soil fumigants. Here again weather gets the blame—late planting caused use to fall below expectations. If any material could be said to have suffered overproduction, it might be methyl parathion. Price reductions are cited as the reason for assuming it to have been overproduced.

Perhaps the most unusual thing about the pesticide situation in the South this year has been the abrupt demise of the cry of "resistance" to chlorinated hydrocarbon insecticides. Light infestations of pests such as the boll weevil account for much of the disinterest in resistance talk.

Resistance reports also suffered body blows from the efforts of manufacturers, formulators, and custom applicators to get farmers to use adequate control programs. As a representative of one large supplier points out, farmers have learned quite quickly the capabilities and limitations of various insecticides, and now use them much more intelligently. Emergency-type control programs—formerly about the only methods of using insecticides—are beginning to be replaced by preplanned, routine, and effective control programs.

In some limited cases, the organic phosphates are cited as a big factor in controlling boll weevils, flies, and mosquitoes. But their expected need has not proved as great as anticipated; the failure of demand to materialize may be a possible cause for any overproduction of organic phosphate insecticides, says one formulator.



Maleic hydrazide was widely used this year to control suckers on tobacco

Herbicides' growth continues at an unspectacular rate in many areas of the South. In the Southwest and the Delta area, cotton continues to be the chief crop receiving herbicides.

Herbicides began to be used in larger quantities and over larger areas for control of scrub trees in forest lands, for control of pasture weeds, and for right of way maintenance and other industrial uses. But they still find little use by most southern farmers; the latter rely on cultivation if they employ any method at all for weed control.

In North and South Carolina, witchweed infestations have developed on a large scale. The 1958 recommendations in South Carolina emphasized witchweed control through soil sterilization and the planting of crops that cause witchweed seed to germinate, but on which the parasitic seedlings cannot feed for survival. Recommendations for control of the weed by preventing its blooming and seed production call for use of 2,4-D.

In several areas of the South soil fumigants find growing interest. Some receive good acceptance as being very specific. Sales volume generally has significantly increased, making fumigants one of the brighter spots in the South's pesticide picture.

Both large and small scale fire ant control programs in the South—including individual farmers' programs—bring significant increases in demand for granular forms of insecticides such as DDT and heptachlor. Fire ant programs appear to vary widely depending on state and local public opinions of the seriousness of the pest, pressures on state and local officials, and the extent of individual farmers' efforts at control.

Among other granular insecticide applications beginning on a limited scale has been use of endrin 2% on sugar cane.

Opinion is varied on the question as to whether use of granular insecti-

cides would grow faster if their reported killing effects on small game and birds received less attention from conservationists. The pro-government decision in the New York gypsy moth case is generally felt to have been helpful in state-wide fire ant control programs. However, some entomologists expect it to have little bearing on fire ant or other pest control programs that use broadcast granular insecticides. There seems to be a trend toward increased dependence on individual programs by farmers who feel that both pest control and killing of wild life on their own lands are their own concern. That the situation is far from settled perhaps best sums up the feelings of most officials.

#### New Materials

In spite of the high costs arising from compliance with the Miller Amendment, in several southern areas field testing of new pesticides accelerates. Soil fumigants and systemics for cattle gain widespread attention among newer materials. Older materials receive some attention as time permits testing in new applications.

The names are many in the test picture for soil pest control. Terracolor is under test and in large scale field demonstrations for a variety of crops. In a mixture with captan, it received special attention for control of seedling diseases of cotton. Turf fungicides, for example Semesan, Tersan, and Kromad, have produced favorable results in tests in the Southeast. And older fumigants such as Nemagon and Fumizone either as liquid or granular materials are being demonstrated more widely on vegetables.

In the area of new uses for established materials, aldrin as a wettable powder in fertilizer mixtures gave excellent billbug control in wide-spread demonstrations in South Carolina. Heptachlor in granular form gave good results against alfalfa weevils when applied during late winter. Hepta-

chlor in a liquid form applied with a boomless weed spray nozzle also gave excellent results.

A pesticide of a new chemical type, Sevin, a carbamate, has been shown to give excellent control of most major cotton pests. This year its testing has been limited to the Delta area and the Rio Grande Valley. The material also promises to be very effective in controlling insects that attack freshly-cut pine wood. Sevin's low toxicity—less than that of DDT—to warm blooded animals and fish helps increase interest in its test results.

With the amount of pesticide research and field testing that is under way this year, many more changes can be expected in the pest control picture, says an entomologist. Had weather been normal, instead of upsetting expected demands, changes in use patterns and recommendations would probably have been as interesting this year as they are expected to be in the future.

## The West

Sales steady, with summer volume making up for lower spring demand. New products do well

**D**ESPITE a very wet early spring in many parts of the West, the 1958 pesticide season shows up largely as a repeat of 1957. Sales are about the same as last year's. Some sales were lost during the rainy seasons, but this loss has been made up by increased business in the second and third quarters. And fungicides have done better this year, helped by those heavy spring rains.

Old-line, large volume products such as DDD, DDT, and BHC are still the pesticide workhorses, and are returning to their sellers their usual small profits. Most companies which have been able to raise their profit margins this year have done so with new products. Stauffer's Trithion and Eptam, Rohm & Haas's Kelthane have done well.

But the generally low profit margins concern members of the industry. There are signs that this situation is about to break—some companies are pulling out of the business; others are thinking of raising prices or cutting service in order to make more money. And there is an increase in the West in direct producer-to-user selling, with users getting a price advantage through eliminating the middle man.

Biggest pesticide news of the year, of course, has been the grasshopper plague in the Southwest and the



An experimental plot at Shell's new agricultural chemicals research center in California, dedicated last spring

Mountain States. But this plague has had much more impact on newspapers than on actual pesticide sales. Shell's aldrin was one of the primary chemicals applied over most of the affected area; according to Shell some one million pounds of aldrin, along with some extra dieldrin, was used for grasshopper control.

Other insect infestations have occurred in localized spots throughout the 11-state area. Arizona had some trouble with cotton insects such as stinkbugs, cabbage looper, and the bollworm. Washington suffered some damage to its corn crop from the corn earworm. Throughout the Pacific Northwest, farmers found more mites and aphids than usual because of the mild winter and early spring. And on California's Central Valley alfalfa crop, there were more spotted aphids than usual.

#### **Educational Troubles**

Potential for pesticide sales is much greater—perhaps disproportionately so—than present sales volume in the West. One reason for this is that western farmers are not sharing in the “farm upsurge” reported by Secretary of Agriculture Benson. A case in point is the fruit growers in Washington and Oregon whose market for apples and pears is not favorable.

Prices to the grower have been low, and the situation has been complicated by hot weather and an extended drought in the area—some 60 dry days in a row through July and August.

Also, most of the crops which western farmers grow are not among those which contribute to the increase in the “average” farmer's income as reported by USDA.

But another reason for the gap between sales and potential is lack of education of the farmers. As one sales manager puts it: “Farmers and applicators continue to expect chemicals to be ‘miracle’ treatments, and perform in spite of inadequate applications.”

Basic pesticide producers have been most effective in getting pesticide know-how through to growers. State and local programs seem to miss the mark in many cases. But the producer, through his sales staff, reaches the farmer who has a problem and offers him a solution to that problem. When the problem extends over a locality, the salesman works with both the farmer and the local distributor to push his product—educating both in the process.

#### **Resistance**

Growers throughout the West are running into increasing resistance of insects to some of the older insecticides. It is spreading, and it is becoming an accepted result of using chemicals. Hence, there is no longer much “news” value in reports of new incidences.

This year, codling moths and mites have shown added resistance to established chemicals such as DDT, parathion, and Systox. But some of the newer products have so far handled these pests adequately. One encouraging result has shown up, too: even if a bug proves resistant to one phosphate chemical, it can be killed with others. This finding is counter to a rather widely-held belief in some circles that if one phosphate would not control a pest, none of the others would either.

The need for more new chemicals to control bugs that develop resistance to the old standbys points up the effect of the Miller Pesticides Amendment. It is now generally agreed that the amendment's requirements slow down commercialization of new chemicals, and increase the development cost—double it in some cases.

But they have not succeeded in stemming the flow of products from the laboratory to the field. California's Department of Agriculture reports, for example, that it has received for registration this year more new chemicals than during any compar-

able previous period. Between March and July 1958, the department registered 28 new chemicals, each for the first time.

The amendment has resulted in holding back some new chemicals, according to companies questioned by AG AND FOOD. These companies examine each new product much more critically now, to make sure that it has a broad enough use to pay back development costs. Marginal compounds stay on the shelf now more often than they did before. And small companies with limited budgets just cannot afford to carry out all the needed studies.

But the bill does provide a measure of security for those chemicals already out on the market, claims one pesticide seller. It prevents a “fly-by-night” company from throwing a chemical on the market overnight, raking up a quick profit at the expense of established products, and then withdrawing the product if it raises questions which cost money to answer.

#### **Technical Trends**

Several technical developments are coming along slowly in the West. One is the application of pesticides in irrigation water. First target—nematodes in sugar beet fields. This treatment still has not shown economic justification, although there is a good deal of interest in it.

For other crops, there is substantial progress. Last year, Shell found in tests at Yuma, Ariz., that its Nemagon soil fumigant was effective on citrus. This year, the company is testing Nemagon on a variety of row crops in both Arizona and California.

In Washington, however, state entomologists who have been trying for several years to control nematodes this way have not been able to get the soil penetration they desire; the soil filters out too much of the chemicals (most of them are not soluble enough in water). But this approach has worked for grass and turf insects which feed just below the surface of the ground.

Another trend in evidence is that toward the use of granular pesticides, particularly those which are used for preplanting control. Granules mix better with the soil, offer better control of application rate, and are easier to apply. And it is here that fertilizer-pesticide combinations are making the fastest headway; both can be applied in this way at the same time the soil is prepared for the crop. Up to this year, however, volume of granular pesticides and pesticide-fertilizer combinations used in the West has remained small.