

CHEMICALS INDUSTRY

editorial staff, summarizing trends and technical—in pest control, from research through marketing

supply of technically trained people adequate for its needs. A possible exception is suitable men for technical field service. A western technical field man for a basic manufacturer says only in rare cases can the type of person be found who can work in the field on sales and service and still take the necessary precise attitude required for technical work.

Meanwhile, there appear to be good prospects for technically trained service men on the farmer side of the operation. Some groups in the West—notably strawberry growers in California and pineapple and sugar cane growers in Hawaii—hire full-time technical men to advise them on scientific matters. These men act as liaison between chemical supply companies and growers, relieve industry men from the necessity of visiting and educating individual growers. More such employment of technical men by grower groups is highly desirable, some western industry men believe.

No New Compounds Expected to Make Big Splash in 1955

New chemicals continue to be introduced and to shift from experimental to commercial use. None seems destined to capture too big a portion of its particular market in the West in 1955, however. Captan, the new organic fungicide, is well established commercially and is expected to enjoy further growth in 1955 (see Corporate Profile on California Spray-Chemical on page 270). Malathion use in Oregon will be widespread if supply is adequate. Dalapon is becoming commercially available in Washington for the first time, where it will be used mainly to control perennial grasses on noncrop land (fence rows, drain ditches, and the like) and on crop land between crops. Dalapon is ex-

pected to be registered for use on one or two crops there toward the end of this growing season. Meanwhile it will also see expanded use elsewhere in the West.

Among the systemics, Systox was used last year in California on apples, cherries, cotton, ornamentals, potatoes, nonbearing peach and pear trees, seed crops, strawberries, and walnuts. There have been no reports of adverse effects, and manufacturers are now assembling data secured during last year's experimental work that is expected to justify further extension of accepted uses.

In the Pacific Northwest, Systox is still considered too expensive for widespread use. It is now registered for use on nonbearing fruit trees in Washington, and it appears likely it will be registered there this year for potatoes. If given this

latter registration, however, its price is expected to deter extensive use.

One prospective major use for Systox in the Pacific Northwest could be on alfalfa seed, a major crop in the area. In alfalfa seed production, if materials such as parathion are used for necessary insect control, then bees are killed, too. Yet bees are responsible for the large yields of which the area is proud. When Systox is sprayed during the part of the day when the bees are not flying, it apparently causes them no harm. If this proves to be true consistently, Systox will find wider use in the area.

Antibiotics have been expected by some to have their first big year commercially in 1955. There is no indication, however, that this will be true in the West. The amount used is expected

As an example of the organic phosphorus pesticide compounds which are spreading in use, malathion is finding strong demand. Here a California grower is applying 4% malathion dust for the control of grape leafhopper



to be very small, primarily because of high cost—about \$50 per acre on pear blight, a major potential outlet.

When AG AND FOOD surveyed the industry last September, western reaction was mixed as to how fast new chemicals were to continue to be introduced; it still is. One western technical representative for a basic manufacturer says it is almost an axiom that you must have new products to stay in business and present indications are that development work on new pesticides is continuing very actively. However, one major producer counters that high cost for toxicology work and residue studies, increasing government regulation, and obsolescence will result in fewer new chemicals being introduced.

Be that as it may, one barometer—the number of pesticides registered for sale in California—shows no sign of a reduction. Some 10,650 were registered the first six months of fiscal 1955, contrasted to 10,400 for the like period of fiscal 1954 and 9700 for 1953.

New chemicals are still coming, with derivatives of propionic acid and combinations of this type herbicide with 2,4,5-T, specific isomers of trichlorobenzoic acid, and a number of new complex amides expected to be submitted for experiment station study in the West and Hawaii in 1955. Chemicals to inhibit sugar cane tasseling are of high interest in Hawaii, with CMU and maleic hydrazide among the most important on which experiments are under way.

Shell Chemical is distributing allyl alcohol in limited research quantities for experimental weed control in tobacco in the South, especially in the Carolinas. Experiment station workers there find allyl alcohol gives good weed control in seed beds. The presently established product is methyl bromide, which has to be put on under tarps and is somewhat costly. Allyl alcohol overcomes these difficulties, but it is very toxic and considerable care will need to be taken in training programs before it can be used commercially, should present experiments prove it to be suitable.

Defoliation of cotton and potatoes, among other crops, is well established these days and hardly need be mentioned. Desiccant chemicals, however, are expected to be more widely used in the future. In the Pacific Northwest, for instance, alfalfa seed, clover seed, and other seed crops are quite extensive. Present desiccants are ethofol in water solution or oils fortified with dinitrophenols or pentachlorophenol. In Washington, limited trials have been run on desiccating beans. Material used is an arsenical, which to date leaves some unsolved residue problems, however.

In Hawaii, sugar cane growers also have dehydration as an objective. Very little progress has been made, however, primarily because dehydration is desired

as a rule in areas where moisture in the soil and air is almost at saturation. Chemicals which have been tried experimentally to hasten leaf dehydration have in nearly all cases been absorbed through leaf tissue. This appears to induce accelerated inversion of sucrose in the stalk to glucose, fructose, and other undesirable secondary sugars.

Spray Drift Damage from Weedicides Drops in West

Whatever the reason—regulation, education, new formulations, or experience—spray drift problems with hormone weedicides have been markedly reduced in the West. As one Pacific Northwest weed expert phrases it, "I see grape growers and wheat growers smiling and shaking hands again." This does not mean the problem is gone, for continued vigilance will be necessary. California and Washington, for instance, still retain hazardous area regulations where hormone-type weed killers are re-

Sales Prospects Good in Midwest, Price Outlook Less Encouraging

PESTICIDES are generally expected to move well in the Midwest this season. Farmer interest is running high, prodded by a winter 10% warmer than normal, high overwintering insect counts, and severe 1954 losses. Corn earworms alone took a \$10 million bite in Indiana last year. Michigan puts its total insect loss at \$119 million. Illinois saw a record outbreak of variegated cutworms in clover and alfalfa, controlled in part by a luckily occurring cutworm disease; corn earworm hit both field and sweet corn harder than at any time in the past 15 years.

Farmers, however, seem the only ones certain to profit, should high pesticide sales develop. Prices are a bit low now, are expected to be wobbly through the season. Price disturbances on 2,4-D and 2,4,5-T are reported already in Minnesota, where one formulator says the price situation in general is the worst he has ever seen. Insecticide margins should hold at about the 1954 level if infestation occurs as expected. An Illinois formulator who ships through much of the Midwest says they had better hold up, because herbicide margins are likely to fall below the 1954 level. Complaints are heard of a squeeze from basic manufacturers who sell under their own label, and consignment problems are said to be growing continually worse.

One Midwesterner put his feelings about consignment selling this way: ". . . The increasing menace of consignment sales of agricultural chemicals is

stricted. Boundaries are being established or modified amicably, however, in contrast to heated discussions of several years ago.

Spontaneous volatility has been corrected almost entirely by use of low volatile esters, such as those of butoxy ethanol, isooctyl, capryl, propylene glycol-butyl ether and the like. In Hawaii, application of hormone weed killers by land equipment instead of aircraft (where there is greater break-up into easily-drifted mists) has alleviated some of the difficulty.

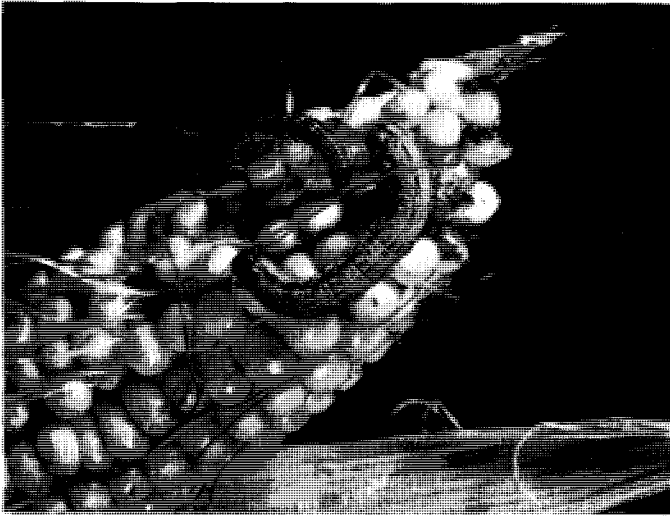
Air application of CMU is being made successfully in Hawaii by dispersing it in a heavy emulsion consisting of an aromatic oil, an activator developed by Hawaiian Sugar Planters Association, and an emulsifying agent all in water. CMU or other insoluble material which has been finely micronized is held in suspension in this emulsion vehicle, and it is not carried by air-borne gusts any appreciable distance from discharge point when applied by air.

the most dangerous practice affecting our industry. We feel it has much to do with demoralized pricing situations and low margins. We feel also that it contributes to the instability of the industry by creating credit and extensions of sales and inventories that can only cause difficulty and demoralize pricing situations as well as weakening not only the supplying formulator, but the so-called consignment customer who in turn extends his business operations beyond what his capital can sustain. In general, we believe that this practice must be stopped at the basic producer's door and that the greatest offenders are the so-called integrated companies. We are firm believers in the fact that a man who pays cash, or who pays for merchandise on regular terms is entitled to a better price, as it is absolutely certain that the cost of consignment is in effect a price concession and any supplier can show a saving on sales made on regular terms."

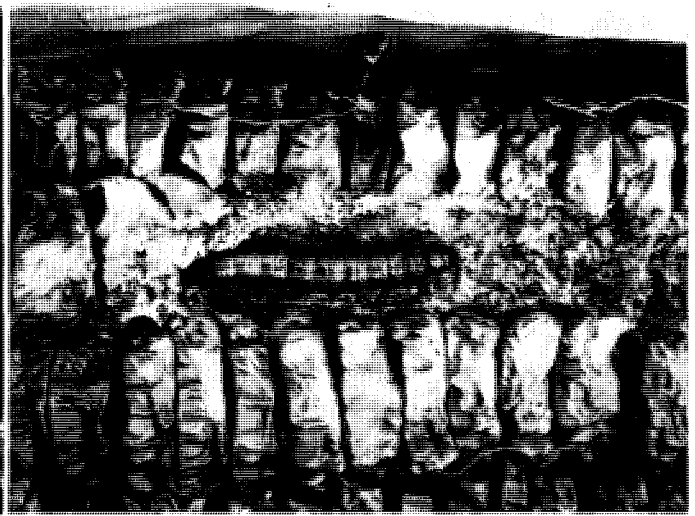
This economic scramble may be breeding apathy. Says an Iowa man, "We've booted prices so badly in the past that no one seems to be very excited about this year's prospects."

Inventory Generally Healthy

Most sources report healthy inventories, running from normal to considerably better than those at this time last year. One basic manufacturer, however, says inventory is up at all levels. Aldrin, BHC, and DDT are perhaps the



The corn earworm, most destructive enemy of ear corn in the U. S., is one of threats most feared in the Midwest this season. It has been wintering farther north than usual



The corn borer, which has caused annual crop damage as high as \$350 million, may give the farmers another bad year in 1955

most plentiful chemicals in the area. Toxaphene, thanks to last year's armyworms, is very low, and is reported to be the subject of some political activity in Minnesota, where calls are said to have been heard for government assistance to ensure adequate, on-hand stock. This would not be particularly sound, since armyworms have reached the state only twice in 40 years, including last year's outbreak.

Acreage controls and lower farm income, as expected, should have little effect on total pesticide sales. Banks recognize the farmer's credit problem and, in Ohio at least, are stepping up publicity on credit facilities. An authority in the eastern part of the Midwest holds that the less cash the farmer has, the more difficult it becomes to persuade him to act against unseen soil pests.

Little change in marketing and promotional techniques is foreseen. Emphasis on more concentrated formulations could develop, and some predict more technical and marketing help for distributors. An Illinois formulator points out, however, that while he would like very much to have more technical men in the field, margins are so tight that he thinks twice before hiring them. Promotional efforts suffer from the same malady.

Some Legislation, Nothing Startling

No startling legislative activity is in sight for the Midwest this year. The Miller Bill, the most important single item, has been very well received. One extension man says that too often in the past, government agencies concerned with pesticide decisions took evasive action to avoid sticking their necks out; under the Miller Bill, action is delineated and required. Introduction of new pesticides will be slowed, but this is not seen as being particularly bad. About 100

pesticidal chemicals are available today, and the trend is away from development of new ones, toward complete investigation and efficient exploitation of those already at hand. Below the basic producer level, the Miller Bill is not expected to have much effect, since most Midwestern pesticide operators have stayed within recommended residue tolerance limits all along.

An Economic Poisons Act, similar to those in other Midwestern states, has been introduced in the Missouri legislature. It calls primarily for label registration and a state testing program. Also in prospect in Missouri is legislation aimed at forestalling a threatened spread of pink bollworm from Arkansas into southeast Missouri cotton.

Registration and pest control operator licensing laws are under discussion in Nebraska, but bills are not likely to reach the legislature during the present season. Pest control operators are currently attempting to form an association; when this is accomplished, laws will doubtless be enacted, probably within the next two years.

Pesticide damage, still very much a problem in the Midwest, may be beating a slow retreat. Thanks to the Miller Bill, local legislation, and continuing education, label reading is becoming a more and more popular practice. Application techniques are improving, and Midwestern commercial operators in particular are said to be doing an excellent job. An Illinois extension man reports that he was called out only once last year to investigate 2,4-D damage to corn.

Insects Are Threatening

Given proper weather, insects could be a real problem in the Midwest this season. Leading the pack is the corn borer, present throughout the corn belt in

the largest numbers since 1949. Corn earworms, who during the past few years have wintered farther north than usual, could again be troublesome. Both Nebraska and Missouri fear grasshoppers, and a number of other pests are present throughout the area.

Control methods will be largely unchanged. Soil pests may get more attention, and fertilizer-insecticide mixtures, despite many problems, are expected to continue their growth. One estimate puts 1954 usage of these mixtures at about 75,000 tons in the 10 Midwestern corn states; aldrin is the most used insecticide. Smith-Douglas is said to be offering a wider selection of combinations this year, and there will probably be others. Fertilizer men dislike the practice, but demand is apparently there, and they must go along if they are to compete.

This season, for the first time, farmers in the Minnesota-Wisconsin area can buy insecticide-treated seed corn. Dieldrin, at one ounce or less per bushel, has proved highly effective against seed attacking pests; it has also proved sufficiently long lived to permit treating the seed 4 to 6 months before planting.

Onion seed, pelleted for smut and onion maggot control, should move ahead well in Wisconsin. Thiram is the recommended fungicide, dieldrin or heptachlor the insecticides. A new Ohio practice will be malathion control of pea aphid in alfalfa; it will be used chiefly in southern Ohio, where spittlebugs are not a problem. Also in Ohio, there should be a further shift toward the newer, less injurious organic fungicides to control apple scab.

Granular insecticides suffer somewhat from poor distribution, and have not entirely relieved the residue problem as many hoped they would. Nevertheless, they should continue to grow in use. E. S. Ganrud Co. offers this year for the

first time equipment for controlled, simultaneous application of seed, and fertilizer and insecticide granules. Last year, Ganrud made postharvest tests of the equipment on alfalfa, using aldrin granules against crickets and grasshoppers.

Iowa State workers last year experimented on a small scale with DDT, EPN, and heptachlor granules for corn borer control. Attapulgit earth and ground tobacco stems served as carriers. The modified grass seeder used to apply the granules was more or less a jury rig, and equipment is felt to be a major problem in this project. Results last year were encouraging, however, and the Iowa people will expand their study to a semicommercial scale this summer, when about 100 acres will be treated. Illinois, also, plans large scale tests of the method this season.

Herbicide Interest Up

Relatively dry weather through much of the Midwest has moved herbicides somewhat into the background in the recent past, but at least one major producer reports high interest this spring. The same report comes from a Minnesota formulator, who cites excellent herbicide results in that area as the spark plug. No particularly new practices are in sight, but there are a few new chemicals and some new uses for old ones.

Perhaps the newest herbicides are Monsanto's CDAA (α -chloro-N,N-diallylacetamide), CDEA (α -chloro-N,N-diethylacetamide), and CDEC (2-chloro-allyl diethyldithiocarbamate). In 1954, more than 2700 field tests under widely differing soil and climatic conditions showed these three to be very promising, grass-specific, pre-emergence herbicides for sweet corn, onions, carrots, and several other crops. None of the three will be commercial in 1955.

Not quite so new, but also still experimental, is amino triazole. An interesting characteristic of this herbicide is its marked selective action within the half dozen or so known varieties of Canada thistle. Wisconsin workers have reported CMU or dalapon to be their most promising chemicals for pre-emergence weed control in corn. In Iowa, both TCA and dalapon have done well experimentally in combatting a major deterrent to birdsfoot trefoil in that area, the time needed to establish a good stand. Dalapon will be offered this year for nonagricultural use, and for spot treatment in agricultural land.

Antibiotics on the Move

Antibiotics are expected to advance rapidly in the Midwest this season, particularly for control of fire blight on pears and apples. Cost is perhaps the biggest road block, and here, U. of Missouri workers report experimental

control of apple fire blight with somewhat lower concentrations than are being recommended. Further work is planned this season to investigate even lower concentrations, synergists, and compatibility with commonly used apple insecticides and fungicides.

Pfizer leads the antibiotics parade with Agri-mycin, cleared by FDA for apple and pear fire blight, bacterial spot of peppers and tomatoes, and several others. By early February, Pfizer had distributors in five Midwestern states stocked and ready to sell. Interest is high. Pfizer's Chicago office got a scribbled note from a farmer which asked in so many words, "How much is this here now Pfizer, and where can I get some?"

Upjohn is offering Actispray, cleared in late January for use on bearing trees to control cherry leaf spot. It had been cleared earlier for post-harvest use on bearing trees, and on nursery stock. Another Upjohn actidione product, a turf fungicide, has been well received by golf course people for the past three years. Merck is not expected to offer Agristrep commercially this year.

Weather and Credit to Have Largest Influence on Sales in South

AGRICULTURAL CHEMICAL LEADERS in the South say business during the last half of 1954 varied from average to below average, depending upon the location. Large segments of the industry in Alabama experienced serious volume and profit reductions. "About average" sales occurred in Louisiana, Mississippi, Tennessee, Georgia, and other parts of the South.

Some leaders say there is no direct correlation between sales and declining farm income, but others think there may be an indirect relationship. Lower gross farm income, they conclude, causes greater use of agricultural chemicals, as farmers strive to reduce their unit production costs if credit is available for purchases.

Cotton farmers, on the other hand, could be slow about using pre-emergence herbicides under reduced government acreage programs. Landowners may elect not to use pre-emergence herbicides in favor of supporting (at least on a subsistence basis) certain families living on their land who are able to supply hand labor for hoeing.

Consumption for normal control programs in Alabama this winter should be slightly higher than last year. Herbicide, insecticide, and fungicide sales will probably move slightly upward during the spring and early summer, provided

Defoliation a Limited Practice

Defoliation is not catching on extensively in the Midwest. It has found use on potatoes, but in limited areas, and Michigan reports a trend toward mechanical defoliation of potatoes in recent years. Soybean defoliation has been tried, also to a limited extent, but it is not expected to grow, primarily because of cost. Except during a wet, extended growing season, defoliation saves the soybean farmer only two or three days. In Kansas and Nebraska, defoliation of alfalfa seed crops has found some use, but again, is not expected to grow markedly. Peas, grown for drying, have been another limited outlet.

Systemics interest Midwesterners, but most feel them to be still several years in the future. In Ohio, however, Systox is expected to move well this season for control of aphids and mites on apples. It is reported effective for pea aphids, but still a bit too costly. Consensus is that more systemic blanks must be filled, primarily in translocation mechanisms and ability to predict toxicity.

adequate rainfall is received for proper plant growth. Profits on this volume will be adequate, but not as high as in the past.

In nearby Georgia, farmers did not use their entire cotton acreage allotment during the 1954 season, and with a further cut in 1955, cotton acreage will be smaller than it has been for years. The outlook for insecticide consumption during the spring and early summer months is about the same as during 1952 and 1953—rain is still badly needed in South Georgia.

Tennessee leaders expect average sales during 1955, with little hope for substantial increases, but the Mississippi outlook is promising, especially for herbicides. Large amounts of phenoxy-type compounds (particularly 2,4-D) will continue to be sold in Mississippi for rice and small grains. Pre-emergence herbicide consumption for cotton will depend mainly on labor supply and weather conditions during the planting season.

Herbicide usage in the Louisiana sugar cane area has been leveling off—1954 will probably be the peak year for acreage sprayed with TCA and 2,4-D. Some of the earlier gains in Johnson grass control may be lost due to confusion in the minds of sugar cane people about the use of dalapon and Karmex W (CMU).



Parathion is used in tobacco insect control for white grubs, weevil, midge, aphids, suckfly, and hornworm. Here a 1% parathion dust is being applied to a tobacco plant bed

In the next two or three months weather will exert the strongest influence on sales. Over the long haul, credit seems likely to play a strong secondary role.

Lack of sufficient information about agricultural chemicals among farmers is still evident, but there are definite signs of improvement. In one Texas County, 90% of the cotton acreage was treated during 1954, as compared with 15% in 1946, a year of record cotton bollworm damage.

Carefully planned extension programs are actually reaching the grass roots areas. In Williamson County, Tex., a hard working committee set up an insect reporting service last year and provided farmers with educational material and special training through the county agent. With the committee's help, 12 farmers on adjoining land initiated an early insect control program. They produced the county's first bale; they led the area in plant growth, uniformity, and early fruiting of the cotton; they finished harvesting two weeks before the rest of the community; and were far ahead in completing stalk destruction. One of the farmers netted a gain of \$1736 on a 40-acre plot over untreated acreage.

A few of the larger companies are retrenching their activities in insecticides. This trend may continue because the small cross-roads blender has an economic advantage through distribution in localized areas. Spencer Chemical does not intend to continue the sale of CIPC; some of the small formulators have already withdrawn from pre-emergence herbicides.

Inventory Dumping Hurts

Dead inventory is always a problem, but not the serious one it has been in the past. Formulator and dealer inventories in Georgia are about normal, down at all levels in Alabama, probably down 10% in Tennessee. Some inventories in Georgia run as high as 10% of total sales, because formulators were forced into consignment selling in order to meet competition.

Aldrin and toxaphene moved very well last year in Tennessee and should not pose any problems, but BHC-DDT combinations exist in substantial amounts. Herbicide carry-over is slight in South Carolina. Most of the old insecticide formulations in Mississippi will be pushed on the market first. Broad range pesticides fare better than specifics in the markets because inventories can be shifted. More credit could be a big help toward reducing inventories in the future.

The real problem is dead inventories of those who go out of business and dump supplies. One product that has had the most trouble stabilizing is 2,4-D, and another is CIPC. Until "fly-by-night" operations are discontinued, dumping practices will tend to hold back the investments of reliable companies selling chemicals on the open market.

Large quantities of cotton insect control materials were unloaded by some formulators in the South this past season. Extension of credit, and the production of broad range materials, will reduce unloading when the market periodically evaporates. Pesticide dumping in the winter months, particularly DDT and toxaphene formulations, has become almost a standard practice for some companies in Florida.

Consignment Selling a Problem

A few basic manufacturers say consignment selling is not a significant problem, that it has a definite place in the industry. They are quick to point out that it provides better distribution of products and helps to overcome inventory difficulties. These companies do not expect any serious problems developing with the extension of credit and time payments. There will be more of these transactions in the future, they say; both farmer and industry are solvent. Formulators in some cases are hoping that manufacturers in general will tighten up on their consignment deals, but the possibility of such action is fairly remote now that the practice is firmly entrenched.

Industry in the Midsouth has gone more toward consignment, rather than away from it. Credit in this area is becoming an increasingly difficult problem, although it is not a serious problem in other parts of the South.

Fair trading of agricultural chemicals is

not looked upon as the "cure-all" of the industry's selling problems, could actually be harmful by delaying proper adjustment to changing conditions. Fair trading, some say, serves only as a tool to take advantage of a seller's market. Agricultural chemicals naturally have a buyer's market—it is a service industry. Foes of fair trade practices claim it is practiced primarily by those having a product monopoly.

Antibiotics Expected to Move Slowly

Little use of antibiotics will be made in Georgia and other parts of the Southeast this year, it is felt. Distributors think that manufacturers should go through existing distribution channels. Some manufacturers also think that markets will develop slowly because it takes considerable time to introduce new chemicals. Basic manufacturers cannot take all of the risks involved with introducing new products. It will be to their advantage if they use distributors, in order to spread the risk around.

Fungicides Gain Popularity

Du Pont's Manzate seems to be faring well in the Rio Grande Valley. It is very effective in controlling blue mold on spinach; downy mildew and powdery mildew on cantaloupe; early blight, late blight, and grey leaf spot on tomatoes. With a total cost of \$20 to \$30 per acre for spinach treatment, it is estimated that this investment increased grower's net profits almost \$200 per acre. Florida reports Manzate usage on tomatoes is increasingly rapidly—growers there cannot take chances without fungicidal protection because of the humidity.

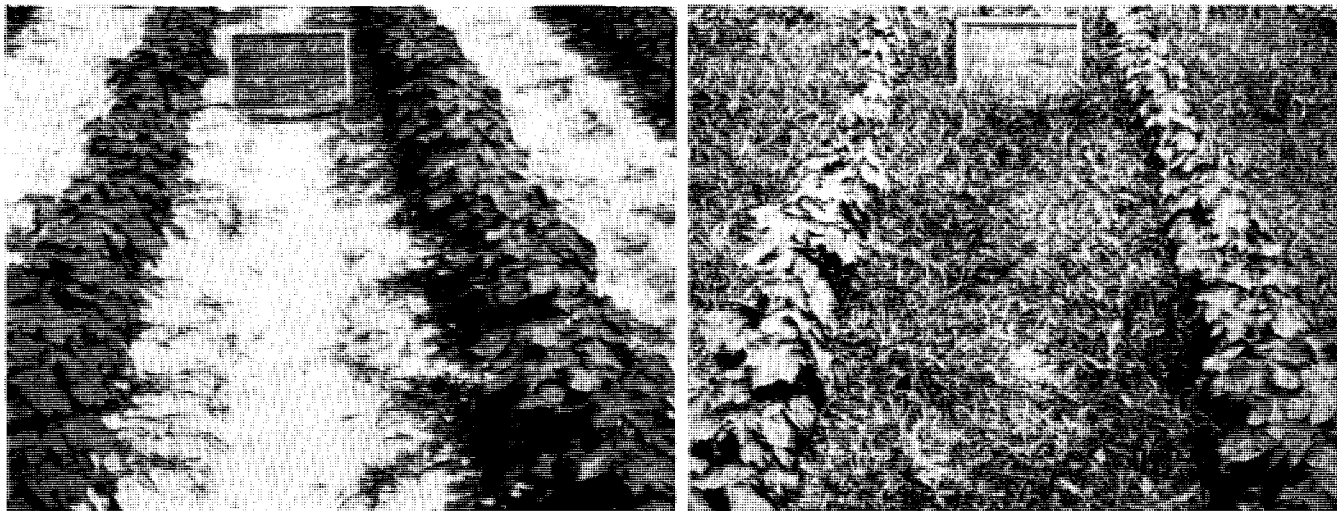
Du Pont Pushes Karmex DL

Du Pont is beginning to push its new pre-emergence herbicide for cotton, 3-(3,4-dichlorophenyl)-1,1-dimethylurea. Supervised grower trials with Karmex DL were initiated in 11 states during 1953. Commercial production followed, so that limited amounts were sold in 1954 throughout the southeastern Piedmont and Midsouth areas. Additional supervised grower trials were undertaken in the eastern Coastal Plain and western irrigated cotton areas. During 1954, Karmex DL was used on over 9000 acres, about 75% of which was in the Midsouth where spray equipment is more commonly available than in other cotton areas.

Plantation operators report hoeing costs ranging from \$5 to \$40 per acre. With the new herbicide, at least one hoeing could be eliminated, and in some cases as many as four hoeings. Cost of applying Karmex DL amounted to less than \$2.50 per acre.

Amino Triazole Looks Promising

Amino triazole, when added to already established brands of defoliant,



Cotton cultivation is one of the areas providing a big market for weed control agents. Here is the reason: test plots at Raleigh, N. C., show cotton six weeks after planting; no weed control agent used in right photo; Karmex DL herbicide used on left

limits second growth from three to six weeks, thus helping to solve a troublesome problem that often limits the value of chemical defoliation. In the past, growers have frequently used defoliant before harvest, but the plant pops out with new leaves before they can get cotton out of the field. In most cases it also gives faster and more complete leaf shed.

Amino triazole was employed on a small scale in 1953, and on a large scale in 1954 at experiment stations across the Cotton Belt. It will be commercially available to cotton growers prior to the 1955 harvesting season.

1955's New Products

What is said to be a new and effective weed seed killer (allyl alcohol) has recently been placed on the market by Shell Chemical for use in tobacco seed beds. It acts as a contact herbicide for control of weed and grass seed, and can be applied with inexpensive equipment. Tobacco seed beds can be planted from 10 days to two weeks after application without harming germination, or as soon as the odor of allyl alcohol has disappeared from the ground. Six quarts are used in 100 gallons of water for each 100 square yards of tobacco seed bed. Allyl alcohol's ready solubility in water makes it easy to remove from application equipment.

Early this year Geigy announced that 2-chloro-4, 6-bis(diethylamino)-S-triazine—Geigy 444—would be available for experimental testing as a selective pre-emergence and a nonselective post-emergence herbicide. It is formulated as a four-pound-per-gallon emulsion for treatment of rye grass, oats, snapbeans, peas, cucumbers, radishes, spinach, cotton, tomatoes, and sweet corn. Weed control is claimed for crab grass, chickweed, narrow-leaved plantain, nutgrass,

panic grass, purslane, ragweed, red-root pigweed, sour grass, and wild onion.

The first effective insecticidal spray for eradication of cattle grub was recently described by USDA workers at the Entomological Society of America meeting in Houston. A 0.5% spray of 3-chloro-4-methylumbelliferone and *O,O*-diethylthiophosphate applied to the backs of nine grubby cattle killed all the grubs (249) in less than a week. Livestock men are advised to continue using standard rotenone, to which the new spray has proved an equal, until further tests are completed.

New Trends Apparent

A new trend in cotton weed control is on its way this year. The idea will be to reduce only part of the weeds and grasses and the size of others, but not to eliminate hoeing entirely, as a method for lowering hoeing costs. Previously adapted agronomic practices, such as hill dropping, may be changed to fit the application of chemicals or combinations of chemicals. Crop protection by directional application will play an important role in the future development of chemicals as herbicides in cotton. Combinations of existing herbicides, and combinations of new herbicides with existing materials will be given many evaluations throughout the South in 1955. The whole picture may be changed as a result of this work.

Brush Control

A new business, unique in this country, has been started by W. H. Glimp, a former rancher in Texas. Glimp began operating in 1953 the first commercial business for chemical eradication of noxious plant life on the range.

Glimp's crew of 11 workers manually

sprays 2,4,5-T mixed with Diesel oil, at a cost of about \$7.00 per acre on fairly heavily infested ranges. Kill averages close to 99% and the land is restored to its previous open prairie condition.

Full grown mesquite is treated by cutting a ring around the trunk (about 18 inches above the base) with a hand axe and filling the cut with a liberal dose of the mixture. Foliage is not sprayed, except for younger mesquite. Results of this chemical eradication have been so effective that Glimp predicts he will soon have several crews operating throughout Texas.

In Oklahoma alone, over 16,000 acres of brush were sprayed with aerial equipment during 1954. Several hundred acres were also treated with ground sprayers. Approximately 7 million acres in Oklahoma are scrub oak land. With brush cover this land has very little productive capacity; however, if properly treated with chemicals, much of it will grow a good grass cover.

Dow is now marketing Silvex for brush control in the South, after numerous tests in Oklahoma on several oak species (also some hickory, sumac, and greenbrier).

Aerial Applications Level Off

Aerial application of herbicides is leveling off throughout the South. One observer remarked: "It can hardly increase since we do everything but plow with planes at present." Unless a cheap plane is developed that will do the job of the Stearman, aerial application of pesticides is apt to decrease.

Spray drift damage is still a growing pain of the industry, although it is decreasing somewhat. Liability suits are probably less this year, around \$4 million, but primarily because most of the cases are being settled out of court.