

Pesticide Supplies and Requirements

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Pesticides start a new season with the best year in their history just behind them. Federal-State spray programs, higher exports, new products were the factors

PRODUCERS OF PESTICIDAL CHEMICALS in 1956 had the best year in the history of the industry. Manufacture of synthetic organic pesticides rose more than 10% above 1955 tonnage to replenish depleted pipelines in the United States and to meet increased pressure of domestic and export demand (Fig. 1). Production in 1955 itself was nearly 10% higher than in 1951, the highest previous year. Whether production will be as great in 1957 will depend upon many factors—weather, inventory carryover, farm prices, Government control programs, and sales abroad. Reasonable profit margins to formulators and dealers are also a factor in assuring that supplies will be available to the grower when needed.

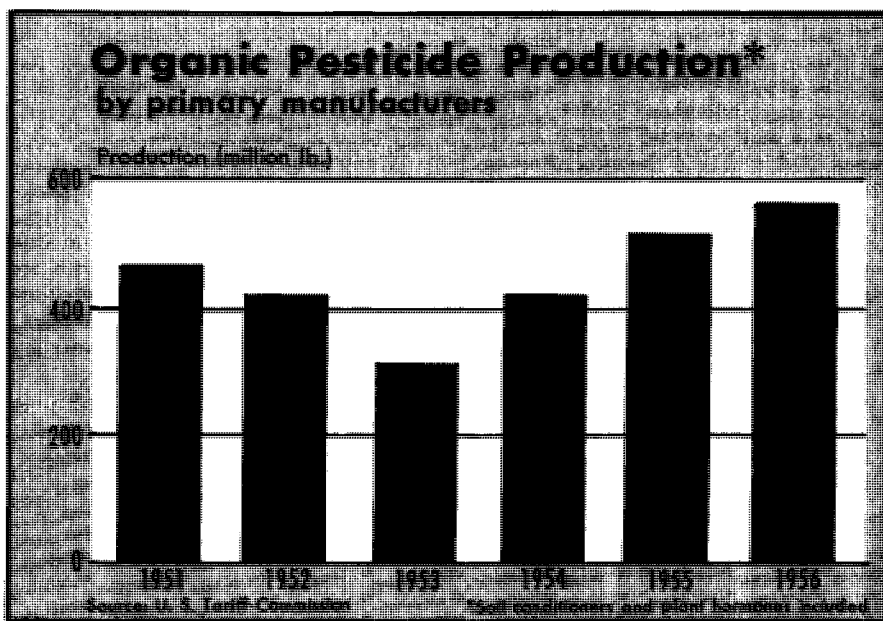
The recent pesticide inventory survey by the U. S. Department of Agriculture showed carryovers from the 1956 growing season in the possession of formulators of mixed goods generally to have increased less, when compared to 1955, than those owned by primary chemical producers. Formulators increased their stocks of the chlorinated hydrocarbon group (aldrin, chlordane, dieldrin, endrin, heptachlor and toxaphene) 20% against an increase of over 90% in the hands of primary manufacturers; formulator stocks of DDT went up 46% and producer stocks 78%. The effect of this carryover upon the pesticide situation in 1957, of course, will depend upon the extent of domestic pest control operations, which, in turn, will be contingent largely upon weather conditions.

Although the carryover of DDT (technical and mixed goods together) from the 1956 season was 66% greater than the 1955 carryover, production during the 1955-56 crop year was only 24.6% higher than in 1954-55. End-of-season stocks of benzene hexachloride (BHC), all grades on the gamma basis, were 74% greater, while production (exclusive of lindane)

during the crop year was up 57.7%.

Production levels indicated by the chart, it should be remembered, do not tell the whole story. Only synthetic organic chemicals are reported by the

vidual manufacturer, production and related data are available for specific chemicals only when these are manufactured by three or more principal producers.



U. S. Tariff Commission; statistics for inorganics such as the arsenicals and sodium chlorate are published by the Bureau of the Census, those for copper sulfate by the Bureau of Mines. No up-to-date production data are available for ground sulfur. For figures showing the supply of the natural products pyrethrum and rotenone, one can use the import statistics from Census. Only those synthetic organic compounds utilized chiefly as pesticides and related agricultural chemicals are classed as such by the Tariff Commission. Hence, the totals shown here do not include carbon tetrachloride, carbon disulfide, and ethylene dibromide, which make up a large part of the volume of grain and soil fumigants. As no Government collecting agencies release statistics which will disclose the operations of any indi-

Domestic sales of finished pesticides rose to a high level in 1956 despite a late start. The freeze of New England fruit reduced the early need for insecticides and the cold spring in many other areas across the country slowed development of insects as much as two weeks. Cotton insecticides for boll weevil control were in good demand in the Southeast and Midsouth, but after active early-season control operations infestations in the Southwest declined because of dry weather. Granular DDT formulations were applied extensively against European corn borer in the Midwest. The spotted alfalfa aphid spread over a large area and its control absorbed large amounts of insecticides. Demand for 2,4-D and other weed killers in 1956 was reported strong, while for fungicides it was nearly normal.

DDT, in the proportion of a pound in a gallon of oil per acre, was sprayed by aircraft on nearly 1 million acres in the Northeast during 1956 in the Federal-State gypsy moth eradication program. Tentative long-range plans made early in 1956 call for two to four times as much spraying against this insect in 1957. Insecticides were applied from the air in 1956 also to 1,366,900 acres of timberland to control the spruce budworm, largely in seriously infested areas of Montana, Idaho, and New Mexico. Trees numbering 304,792 were hand sprayed against bark beetles, principally in Colorado, Montana, and the southeastern states. Weed killers were applied on 10,780 acres to kill wild currant and gooseberry bushes likely to transmit blister rust to pines.

Medfly Eradication

The Mediterranean fruit fly, discovered in Florida last April, was the most pressing problem facing pest control officials in 1956. By the end of the year over three-quarters of a million acres had been treated in the eradication program. The aggregate number of acres sprayed totaled 5,802,953 on Dec. 1, 1956. The spray is composed of malathion in water, combined with hydrolyzed protein, as a poisoned bait to attract the adult fruit flies. Supplemental soil treatments with chlorinated hydrocarbon insecticides have been made over several hundred acres. Some 25,000 detection traps, baited with oil of angelica seed or a recently developed synthetic substitute, have been placed throughout most of Florida to attract the male flies as a check on results. The program is being continued to effect complete eradication of this destructive pest of many fruit and vegetable crops.

More than 2 million acres of rangeland in 10 western states was treated with insecticides in 1956 under cooperative programs to suppress grasshoppers. Farmers kept grasshopper damage to crops at a minimum by applying sprays, dusts, and baits to more than 4.5 million acres. Surveys of populations of adult grasshoppers and their eggs in the soil during the late summer and fall of 1956 showed infested rangeland areas to total over 22 million acres. Further surveys in the spring of 1957 will provide more information upon which to base control plans for the coming season.

The production of some principal pesticides for the crop year 1955-56 and preliminary estimates of domestic requirements for 1956-57 are shown in Table I. Cotton growers are shifting to calcium arsenate and organic

Table I. Pesticidal Chemicals: Production in 1955-56, and Estimates of Domestic Requirements for 1956-57

Material	1955-56 Production (1,000 lb.)	1956-57 Requirements ^a	
		Minimum (1,000 lb.)	Probable maximum (1,000 lb.)
Benzene hexachloride (gamma basis)	13,535 ^b	7,000	9,000
Calcium arsenate	24,000 (est.)	15,000	25,000
Copper sulfate	146,056	30,000 ^c	45,000 ^c
2,4-D acid	29,000 (est.)	27,000	30,000
DDT	137,747	50,000	70,000
Lead arsenate	14,000 (est.)	10,000	12,000
Pyrethrum (flower equivalent) ^d	6,960	6,500	7,500
Rotenone (roots) ^d	6,350	6,000	6,500
2,4,5-T acid	4,501	3,000	4,000
Aldrin, chlordane, dieldrin, endrin, heptachlor, and toxaphene	80,418	40,000	50,000

^a Preliminary estimates.

^b Not including lindane grade BHC; estimated requirements include lindane.

^c Includes all agricultural uses.

^d Imports; 135,566 pounds pyrethrum extract included in terms of flowers.

phosphorus derivatives to control boll weevils in areas where these insects show resistance to chlorinated hydrocarbons. Effective new organic phosphorus insecticides of the systemic type, as well as new nematocides and herbicides, are in process of development and expanding sales. Significant programs being eyed for their potential impetus to chemicals are the agricultural conservation (Soil Bank) and expanded highway programs.

The value of pesticides exported during the crop year 1955-56 amounted to \$77,207,000, up 3% from the previous year (Table II). The weight of benzene hexachloride exports reported is on the gamma basis instead of total weight of mixed goods; from the figure are excluded mixtures containing less than 1% gamma BHC or 20% or more of sulfur. "Copper sulfate" includes both normal and basic sulfate but not Bordeaux mix-

ture. DDT exports are reported separately only when the material contains 25% or more of this pesticide; these reports like those for BHC are on a technical (100%) basis rather than total weight of mixture. "Agricultural sulfur" includes conditioned sulfur, sulfur paste, wettable sulfur, lime-sulfur, and such other mixed goods as contain 20% or more of sulfur. "Agricultural insecticides" includes BHC and DDT preparations at strengths too low to be separately reported, mixtures containing less than 20% sulfur and not reported elsewhere, and specialties such as some of the chlorinated hydrocarbons and organic phosphorus compounds, as well as fungicides and similar preparations for agricultural pest control. No separate export figures are available for 2,4-D, all weed killers being reported in a category separate from "agricultural insecticides, n.e.c."

Table II. Pesticide Exports by Crop Years

Material	1953-54 (1,000 lb.)	1954-55 (1,000 lb.)	1955-56 (1,000 lb.)
Benzene hexachloride (gamma basis)	2,076	3,941	3,537
Copper sulfate	57,177	72,265	66,461
DDT	42,743	51,068	54,821
Sulfur, agricultural	36,770	41,529	19,030
Weed killers	13,421	15,018	19,793
Insecticides, agricultural ^a	97,746	117,593	100,790
Insecticides, household	12,854	17,459	17,630
Total^b	262,787	318,873	282,062
	(\$1,000)	(\$1,000)	(\$1,000)
Value of all pesticide exports reported^c	56,228	74,902	77,207

^a Not elsewhere classified.

^b These figures are not the true totals because BHC and DDT are reported only in terms of the active ingredient.

^c Includes nicotine, pyrethrum, lead arsenate, and calcium arsenate for which separate export figures also are available (except for first six months of 1956).

Source: Bureau of the Census.