Pesticide Supplies and Requirements

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CONTROL OF INSECT POPULATIONS in the United States during the 1955 season required larger quantities of insecticides in general than for three or four years. Infestations of grasshoppers and the European corn borer occurred in Midwestern areas. Weather favorable for development of the boll weevil and the rank growth of cotton plants, especially in the Mississippi Delta region and vicinity, led to increased insecticide usage. Requirements for cotton poisons in that area were also increased because of removal of the chemicals by rains, making numerous applications necessary. Such factors more than offset the effect of dry weather in other areas upon insecticide sales in 1955.

The market for weed killers and for fungicides such as ferbam, maneb, and captan was active in 1955. The total (domestic and export) disappearance of 2,4-D in the last crop year appears to have been nearly 29 million pounds, well above any previous year.

Recent developments in the application of insecticides favor an active market for a number of newer purposes. Soil fumigation and treatment of the soil with solids, both directly and in fertilizer mixtures, are increasing. The development of granular formulations promises to aid in the effective and convenient use of pesticides under a variety of conditions. Treatment of cottonseed with a systemic chemical prior to planting may eliminate some early sprays with other insecticides, the systemic controlling aphids, spider mites, and thrips on the young plants for the first six to eight weeks of their growth.

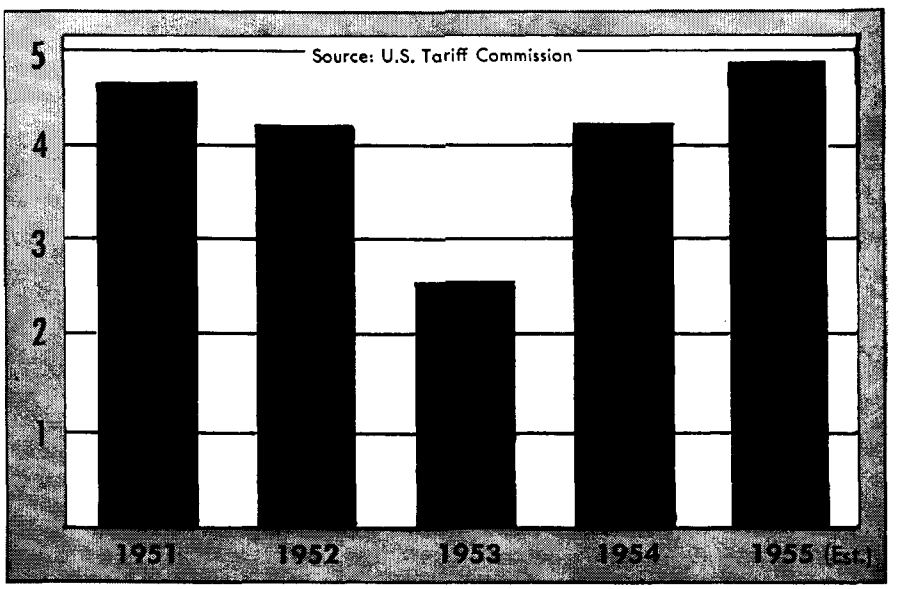

Figure 1. Production of organic pesticidal chemicals by basic manufacturers in calendar years in millions of pounds. Soil conditioners and plant hormones included

Production of organic pesticidal chemicals and related materials as reported to the U. S. Tariff Commission is given in Figure 1. The figures include production of fungicides, seed disinfectants, plant hormones, soil conditioners, insecticides, rodenticides, and fumigants. These statistics give evidence of the recovery of the industry in 1954 from its overstocked condition which developed in 1951 and 1952. A number of basic manufacturers have adjusted their production schedules to avoid the economic drain of excessive inventories. In a few cases firms have dropped out of production temporarily, adapted their plants to produce other chemicals, or even dismantled their facilities. In 1951 there were 12 producers of DDT and 16 of benzene hexachloride; in 1955 both chemicals had nine producers. Despite the smaller number of manufacturers, U. S. production of DDT in the calendar year 1955 is expected to have been about 123 million pounds. This is the highest figure attained for any synthetic organic pesticide, the previous record being for BHC, gross production of which reached nearly 117 million pounds in 1951 but dropped to about half that much by 1953 and 1954. Production statistics in Table I are not comparable with those in Figure 1 because inorganic materials are included as well as some fumigant mixtures and other products not classified as pesticides by the Tariff Commission.

Carry-over stocks of pesticidal materials in the possession of manufacturers Sept. 30, 1955, are shown in Table II. These include both technical chemicals and formulated mix-

Table I. Production in 1954–55 and Domestic Requirements for Pesticidal Chemicals in 1955–56

Material	1954–55 Production (1000 Lb.)	1955–56 Agricultural Requirements: Minimum (1000 lb.)	1955–56 Agricultural Requirements: Probable maximum (1000 lb.)
Benzene hexachloride (gamma basis)	8,582[a]	7,000	10,000
Calcium arsenate	3,500 (estd.)	8,000	12,000
Copper sulfate	144,104	40,000[b]	65,000[b]
2,4-D acid	33,100	...	...
DDT	110,550	55,000	70,000
Lead arsenate	13,500 (estd.)	15,000	18,000
Parathion	5,000	4,000	5,000
Pyrethrum (flowers)[c]	7,375	7,500	8,500
Rotenone (roots)[c]	5,954	6,000	7,000
2,4,5-T acid	2,475	...	...
Aldrin, chlordane, dieldrin, endrin, heptachlor, and toxaphene	63,881	50,000	60,000
Miscellaneous	255,000	225,000	240,000

[a] Not including lindane grade BHC.
[b] Includes trace element use for plant nutrition.
[c] Imports; about 126,000 pounds African pyrethrum extract included in terms of flower equivalent.
[d] Does not include sulfur; includes estimates for over 40 materials.

tures, whether owned by the basic chemical manufacturer or the mixer, but do not include stocks of firms functioning solely as distributors or dealers. This is the final report of the annual inventory survey conducted by the U. S. Department of Agriculture in cooperation with the National Agricultural Chemicals Association. About 175 manufacturers, including most of the principal producers, provided information. It is believed the results are fairly comparable with those of the survey made a year ago. Indications of trends are based solely upon reports of firms that supplied figures both years. The reported quantities for stocks on Sept. 30, 1955, have in a few cases been adjusted on the basis of industry-wide data obtained earlier in the year by the Tariff Commission.

Stocks of pesticides at the end of the 1955 growing season appear as a whole but little under inventories at the same time in 1954. The 1955 season being one of fairly heavy demand, the stock situation, therefore, may be considered adequate. Evidence of developing resistance of boll weevil in Louisiana to chlorinated hydrocarbons perhaps was responsible for the reduction of calcium arsenate stocks to a quarter of their previous level. DDT inventories remained rather steady while BHC carryover was reduced presumably by the heavy demand for cotton insecticides. A marked increase in inventories in the category that includes captan is due largely to expanded production and demand for such items.

Table II. Pesticide Stocks in Possession of Manufacturers Sept. 30, 1955, Compared with 1953 and 1954

(Technical basis)

Materials	Stocks on Hand Sept. 30, 1955 (1000 Lb.)	% of 1955 Stocks Reported as Formulations	Sept. 30, 1955, Stocks as % of Stocks on: Sept. 30, 1954	Sept. 30, 1953
BHC, including lindane (gamma basis)	3,900	53	60	68
Calcium arsenate	1,625	18	24	15
DDT	29,250	50	101	94
2,4-D (acid basis)	10,000	55	122	120
Lead arsenate	6,900	19	109	106
Sulfur	36,000	47	112	88
2,4,5-T (acid basis)	2,000 (estd.)	58	89	78
Aldrin, chlordane, dieldrin heptachlor, toxaphene[a]	16,400	50	96	61
Captan, chloro-IPC, DDD, dithiocarbamates, malathion, methoxychlor, parathion, sodium TCA[a]	20,800	48	178	169
All materials[b]	153,700	48	98	83

[a] Figures for materials produced principally by less than three firms are not given individually. [b] Included are a number of chemicals not named above.

Estimates of requirements are similar to those made for 1954–55, there being but little means of predicting future conditions of infestation. There is some renewed interest in calcium arsenate where the boll weevil is believed to have developed a degree of resistance to the chlorinated hydrocarbon type of insecticide. The requirements of the Miller amendment to the Food, Drug and Cosmetic Act favor increased use of materials such as pyrethrum and rotenone which need no tolerance on food crops, or methoxychlor, malathion and captan which have a high margin of residue tolerance.

Exports of pesticides were greater in 1955 than the previous year on the basis of data from the Bureau of the Census for the first 10 months of those years. The total value of exports in the 10 classes listed in Table III was $65,450,993 in the period January to October 1955 inclusive, and $51,326,986 in the same period in 1954. DDT exports continued to mount in 1955, accounting for about 45% of domestic production (Table IV). This was at the same time that domestic disappearance rose to about 62 million pounds for the crop year from barely over 45 million pounds the previous year. Exports of copper sulfate, agricultural sulfur, and weed killers have been relatively even for the past three years while those of miscellaneous agricultural insecticides reported in the Census basket code have doubled in the same period.

Table III. Pesticide Exports from January to October Inclusive in 1953, 1954, and 1955[a]

Material	1953 (1000 Lb.)	1954 (1000 Lb.)	1955 (1000 Lb.)
Benzene hexachloride (gamma basis)	1,610	1,849	3,896
Calcium arsenate	3,570	1,266	1,506
Copper sulfate	55,549	51,857	61,577
DDT	26,880	37,149	46,179
Lead arsenate	210	637	773
Sulfur formulations (20% or more)	26,450	9,697	9,276
Sulfur, agricultural	20,239	24,661	23,289
Weed killers	11,139	13,446	13,584
Insecticides, agricultural[b]	56,859	83,825	101,240
Insecticides, household	10,369	11,772	15,123

[a] Nicotine, pyrethrum extract, *p*-dichlorobenzene, and disinfectant figures available but not included. [b] Not elsewhere classified.

Table IV. DDT Production and Exports

Calendar Year	Production (1000 Lb.)	Exports: Quantity (1000 lb.)	Exports: Proportion of production (%)
1951	106,139	...	...
1952	99,929	32,288	32.3
1953	84,366	31,410	37.2
1954	97,198	42,329	43.5
1955[a]	102,802	46,179	44.9

[a] First 10 months.

Harold H. Shepard, staff specialist on pesticides for USDA's Foods and Materials Requirements Division, is greatly responsible for the annual review called "The Pesticide Situation," which is so valuable to the agricultural chemicals industry. Dr. Shepard first came to USDA in 1946 to take charge of the insecticide testing laboratory at Beltsville. Before that he was assistant professor of entomology at the University of Minnesota and later associate professor at Cornell. During the war he put in two years of government service with the War Food Administration.