

ACREAGE OF SOME CULTIVATED CROPS PROVIDING NECTAR OR POLLEN OR BOTH TO HONEY BEES

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Introduction

DURING the past few years there have been indications that it has been difficult for commercial beekeepers to make adequate profits. Profitable honey producing locations are hard to find and changes in agricultural practices are preventing adequate colony buildup, according to Oertel (1966). The number of colonies is decreasing.² The price of honey received by the beekeeper did not advance appreciably in the past 15 years until the Fall of 1971. Anderson (1969) says that beekeepers reported to him that they were receiving poor financial returns. McGregor and Levin (1970) stated that commercial beekeepers are being "forced by economics to abandon the bee business." Thousands of colonies have been killed by insecticides in recent years. On the other hand, Barr (1972) projected that pollination services would increase in the future, partly because farms will become larger and fewer. He estimated that there will be about 100,000 fewer farms each year for the next 10 years. Younger and better informed farmers are likely

to make more use of pollination colonies.

I thought that it might be worth while to find out what is happening to the acreage of some cultivated crops that honey bees visit for nectar or pollen or both. In other words, to take an inventory of some of the cultivated crops that beekeepers depend upon for honey production and pollination rentals. The reader may think that additional species should be included, or on the other hand, omitted, but the ones included are each fairly typical to illustrate changes in the acreage of crops grown. The following material is mainly taken from Agricultural Statistics,³ a yearly estimate obtained from farmers and business people. More detailed information for each state can be obtained from the Agricultural Census Reports⁴ (See Tables 2, 6).

Table 1. — The acreage of alfalfa, red clover and sweetclover grown for seed

Alfalfa			
State	1948-57	1962-66	
California	115,400	108,000	
Kansas	115,400	89,000	
South Dakota	145,300	88,000	
Oklahoma	80,000	58,000	
Nebraska	100,000	54,000	
Total United States	1,014,000	686,700	
Red Clover			
Illinois	219,000	159,000	
Ohio	193,000	119,000	
Indiana	158,000	99,400	
Missouri	121,000	91,600	
Iowa	194,000	55,800	
Total United States	1,455,000	794,000	
Sweetclover			
Minnesota	52,000	17,400	
Texas	53,500	12,500	
Kansas	38,000	15,400	
South Dakota	19,000	16,200	
Nebraska	28,000	10,000	
Total United States	284,000	103,800	

Planted Crops

The total acreage of planted crops in the United States is listed as 336 million in 1948-57 and down to 316 million in 1967. The total was below 300 million acres in 1962 and 1966. Some crops have had a rapid decline in acreage in recent years. For example, buckwheat planted has dropped from 530,000 acres in 1944, to 177,000 in 1954, to 57,000 in 1964. No figures are included in Agricultural Statistics for

the crop since 1964.⁵ White clover harvested for seed dropped from 28,000 acres in 1958—62 to 10,000 in 1967. No breakdown by states is given in the recent reports. Alsike clover grown for seed has declined from an average of 111,700 acres in 1945-49 to 44,000 in 1955-59 and 3,000 in 1963. Crimson clover grown for seed is no longer listed by states nor by acres in the 1969 issue of Agricultural Statistics. In 1952-56 there was an average annual production of 18,760,000 pounds of crimson clover seed. Production dropped to a reported 10,000,000 pounds in 1962-66 and to 8,000,000 pounds in 1968 (preliminary). The amount of land used for growing common, hairy and purple vetch is not given in the latest tables. The older tables show that seed production of the vetches mentioned just above was decreasing.

Table 2. — Reported number of bearing trees¹

Principal states	1959	1964
Apples		
Washington	4,145,000	2,590,000
New York	2,555,000	2,500,000
Virginia	1,550,000	1,465,000
Michigan	2,200,000	2,284,000
Pennsylvania	1,500,000	1,570,000
United States	20,265,000	21,354,000
Peaches		
California	9,654,000	10,380,000
South Carolina	3,786,000	3,520,000
Michigan	1,620,000	1,245,000
Pennsylvania	956,000	1,203,000
Georgia	3,608,000	2,770,000
United States	26,314,000	31,055,000
Cherries		
Michigan	3,736,000	4,054,000
California	555,000	607,000
New York	952,000	769,000
Oregon	668,000	574,000
United States	8,120,000	8,190,000
Pears		
California	8,812,000	8,858,000
Oregon	87,000	83,000
Washington	370,000	355,000
New York	184,000	127,000
United States	24,500,000	22,005,000

¹United States Census of Agriculture, U.S. Dept. of Commerce, Bur. of the Census, 1964. U.S. Govt. Printing Office, Washington, D.C. 20402.

Alfalfa, Red Clover, and Sweetclover

The area devoted to alfalfa, red clover, and sweetclover seed production is declining, as shown in Table I. Opportunities to rent colonies of bees to growers of seed, based on estimated acres grown, are only half as good as they were about 20 years ago.

Hay Crop

The estimated amount of land in hay—alfalfa, alfalfa mixtures, clover, timothy,⁶ clover and grass mixtures—has remained relatively constant since 1948-57; approximately 42 million acres. Most of the "All hay" is grown in the mid-western states, the Dakotas, Kansas, Nebraska, a few western states, New York, and Pennsylvania. The 7

¹I appreciate the use of reports and other facilities in the Bee Breeding Laboratory, Baton Rouge, La.

²See Statistical Reporting Services, U.S. Dept. Agriculture.

³Agricultural Statistics, United States Dept. of Agriculture, GPO, Washington, D.C.

⁴United States Census of Agriculture, U.S. Dept. of Commerce, Bureau of the Census, 1964. U.S.G.P.O., Washington, D.C. 20402.

⁵The 1964 Agricultural Census figures are 48,000 acres (See Table 6).

⁶I realize that timothy is not a nectar plant, but the tables used do not separate timothy acreage from the other hay species.

⁷For some reason, the watermelon acreages given in the 1968 report for 1961, 1962, and 1963, are from 6,000 to 22,000 less than those given in the 1965 report for the same years.

⁸For a detailed discussion of the crops in California that need honey bee pollination see W. Stanger and R. W. Thorp, 1967, Honey bee pollination in California, *Gleanings in Bee Culture*, 95 : 8, p. 457-461.

southern states—from North Carolina to Texas—have relatively small areas in the "All hay" classification; only 432,000 acres in all.

Table 3. — Acreage of blueberries in major producing states¹

State	1949	1959	1964
Maine	22,440	24,970	21,800
New Jersey	2,674	6,030	8,100
Michigan	1,731	5,000	8,000
North Carolina	568	1,895	3,500
Washington	207	619	620
Total United States	30,880	43,094

¹ Taken from Blueberry Culture, 1966. P. Eck, editor and N. F. Childers, co-editor, 378 p., State University Press, Rutgers University, New Brunswick, New Jersey.

Table 4. — Acreage of cranberries

State	1948-57	1962-66
Massachusetts	14,000	11,500
New Jersey	5,300	2,940
Wisconsin	3,600	4,500
Washington	800	990
Oregon	400	500

Table 5. — Acreage of cucumbers grown for commercial use

State	1949-57	1962-66
Michigan	40,700	21,400
Wisconsin	21,100	14,500
North Carolina	17,800	25,900
Florida	13,100	8,800
Texas	7,800	8,800

The decline in acreage of some crops does not always result in a decline of total production. In some cases the production per acre or fruit tree has increased while the acreage under cultivation has declined. The reader might say that the acreage devoted to legume seed production can and should be increased. However, market demand and price will probably be the important factors considered by the grower. Attacks by insects or new diseases, directly or indirectly, may result in a reduction of demand for seed of some species, i.e. the sweetclover and the alfalfa weevils have reduced the acreage of sweetclover and alfalfa in some parts of the Middle West.

Tree Fruits

We have known for many years that the yields of some species of tree fruits increased when colonies of honey bees were located near or within the orchards. Griggs (1953) stated that all almond and sweet cherry varieties and most apple, plum and pear varieties create problems in pollination. Most peach varieties are self compatible with their own pollen, therefore probably have less need for colonies of honey bees in the orchard than the fruits mentioned just above. Table 2 gives the number of bearing trees for the leading tree fruits as reported in the census. Unfortunately, I do not know how many trees there are per acre of the species given. Wherever dwarf varieties

are grown the number of trees per acre will be higher than in orchards where standard varieties are planted.

Citrus Fruits

Citrus fruits—oranges, tangelos, tangerines, temples, grapefruit, lemons, and limes—have increased in acreage; from an estimated average of 823,000 in 1954-56 to an average of 1,800,000 in 1966-68. Most of the acreage is in Florida and in California, with some small areas in Arizona and Texas. Agricultural Statistics does not breakdown, by states, the acreage of the fruits given just above. The production for each state for each fruit species is given in number of boxes.

Minor Fruits

Seven minor fruits—nectarines, avocados, persimmons, pomegranates, olives, figs, and dates—are lumped together in Agricultural Statistics. There were an average of 86,000 acres of them in 1954-56 and 83,000 in 1966-68. Blueberry acreage in the major producing states is given in Table 3. Martin (1966) has reported dramatic increases in yield in Michigan by the proper use of honey bees as pollinators. Cranberries are grown commercially in only 5 states (see Table 4). Cucumbers for commercial uses are grown in nearly all of the states in the Union (see Table 5). At this writing personnel at the Bee Breeding Laboratory, Baton Rouge, are carrying on a program to determine the effect of honey bees upon cucumber yields in Louisiana. Melon

(honeydew and water-) acreage has dropped, from 387,000 in 1949-53 to 285,000 in 1962-66.⁷ Texas has about 70,000 acres in watermelons while Florida has about 60,000. Growers in Florida rent colonies of honey bees for pollination of melons, but I do not know what the practice is in Texas and other states.

Some other plant species that are grown commercially and are locally important to beekeepers are cotton, lima beans, mustard, safflower, sainfoin, sunflower, trefoil, blackberry, raspberry, and some vegetables grown for seed. The amount of land devoted to some of the above species is not included in Agricultural Statistics, but is given in the Census of Agriculture, see Table 6. The acreage of sunflower, sainfoin, trefoil and tung trees is not included in the 1964 Census of Agricultural figures.

Soybeans

The interesting observations reported by Jaycox (1970) on soybeans in Illinois are hopeful signs that that species will become a reliable nectar source. Soybean acreage has been increasing rapidly in the past few years; to approximately 40 million acres in 1968. The acreage for the major states is given in Table 7. Although soybeans are generally considered to be self-fertile, there is a little cross pollination, according to Caviness (1970). More information is needed on the relationship between honey bees and soybean flowers.

Table 6. — Reported acres of certain harvested crops¹

	1959	1964	Principal states where grown
Apricot	2,890,000	3,000,000	California, Washington
Raspberry	24,000	19,000	Michigan, Oregon
Blackberry & dewberry	9,400	7,700	California, Texas
Buckwheat	55,000	48,000	New York, Pennsylvania
Safflower	200,000	301,000	California had 242,000 acres in 1964; Montana, Nebraska

¹ Bureau of the Census for 1964, see footnote for Table 1.

Table 7. — Acres of soybeans grown for seed in the 10 leading states, average for 1962-66.

State	Acres
Illinois	5,824,000
Indiana	2,777,000
Iowa	4,228,000
Arkansas	3,364,000
Missouri	3,000,000
Minnesota	2,820,000
Ohio	1,913,000
Mississippi	1,500,000
Kansas	850,000
North Carolina	840,000
Total: United States in 1968	41,000,000

Table 8. — Acreage devoted to peanut culture.

State	1949-57	1962-66
Virginia	130,000	105,000
North Carolina	220,000	175,000
Georgia	794,000	503,000
Alabama	327,000	199,000
Oklahoma	172,000	121,000

Peanuts

At the present time little or nothing is seen in bee journals about the pollinating or nectar gathering behavior of honey bees on peanut flowers. Leuck and Hammons (1965) reported that in Georgia honey bees collected pollen from peanut flowers. On some days they "... observed an abundance of honey bees in peanut fields." In a personal communication to me they stated that they did not know whether peanut flowers have nectaries or not. There are about 1½ million acres devoted to peanut culture in the United States, see Table 8.

If beekeepers are to devote more attention to renting colonies for pollination then accurate information is needed about the costs of moving colonies from crop to crop—for pollination services, for honey production and a combination of the two. Colony management may need to be modified if more emphasis is placed on using honey bees for pollination rather than for honey production. The greatest need, at present, for pollination services, as derived from the tables of crop data as listed above, is in the Pacific Coast states, Texas, Florida, Minnesota, Wisconsin, Michigan, and New York. California, by all odds, has the greatest need for honey bee colonies for pollination.⁸

Summary

The acreage of alfalfa, red clover, and sweetclover grown for seed in the United States has decreased rapidly since 1948-57. Minor legume crops

such as alsike, white and crimson clover, and the vetches are now grown in such small acreages that data by states are no longer included in Agricultural Statistics. The amount of land devoted to alfalfa hay, alfalfa mixtures, clover, timothy and clover mixtures, has remained relatively constant since about 1950. Beekeepers in such areas are not likely to see any shrinkage of nectar sources in the near future unless damage caused by pests increases.

Fruit acreage has been maintained fairly well. Probably there will be an increased demand for fruit pollination colonies except for those that require much hand labor. The acreages of blueberries, cranberries, cucumbers, cane fruits, and so on, will probably increase slightly. Increased emphasis on honey bee pollination may result in more production.

Soybean acreage increased rapidly in the 60's; up to about 40 million acres in 1968. More attention should be

given in more areas concerning nectar production of various soybean varieties.

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