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SILKING of SWEET CORN
as a factor in corn earworm control

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Cover Photograph:

This corn silk is in the early wilt stage.

SILKING OF SWEET CORN AS A FACTOR IN CORN EARWORM CONTROL

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A unique combination of difficulties is encountered in attempts to control the corn earworm in sweet corn. The larvae are vulnerable to insecticidal residue only briefly, and the maintenance of this residue is complicated by the prolonged silking period and by the manner of silk growth. Since the preponderance of ear infesting larvae derive from eggs deposited on the silk, the distance traveled by the larvae in reaching the silk channel is at most a few inches. Thorough insecticide coverage along this path is basic to good control. Silks appear over a period of several days and silk growth continues for a short time after initial appearance. Inasmuch as silk growth originates near the silk base within the husk, any chemical barrier placed on the silk recedes from the ear tip with silk elongation. Frequent, repeated insecticide applications are therefore an essential feature of the spray program.

This study was undertaken to provide detailed information on silking performance during the period in which insecticidal coverage is a problem. The variations encountered hold special interest, since these are suspected of being partially responsible for observed inconsistencies in control results.

The data were taken from four varieties in 12 plantings, 37 plots in all, at Wooster during 1955 and 1956. A hundred plants were selected and marked in each plot prior to silk appearance. The selections were at random except that obviously diseased or injured plants were excluded. Silks were tagged and dated upon appearance and the wilting date also noted. Tags were collected at harvest, those from immature or smutty ears being discarded.

Although the mean rate of silking varied little among the four varieties, there was considerable variation among plantings of the same variety (Figures 1-4). For all varieties and plantings an average of about 8 days was required for 95 percent of the plants to show silk, with a range of 5 to 10 days (Table 1). As might be expected, silking progressed at the minimum rate on plots that silked very early or very late in the season when temperatures were lowest.

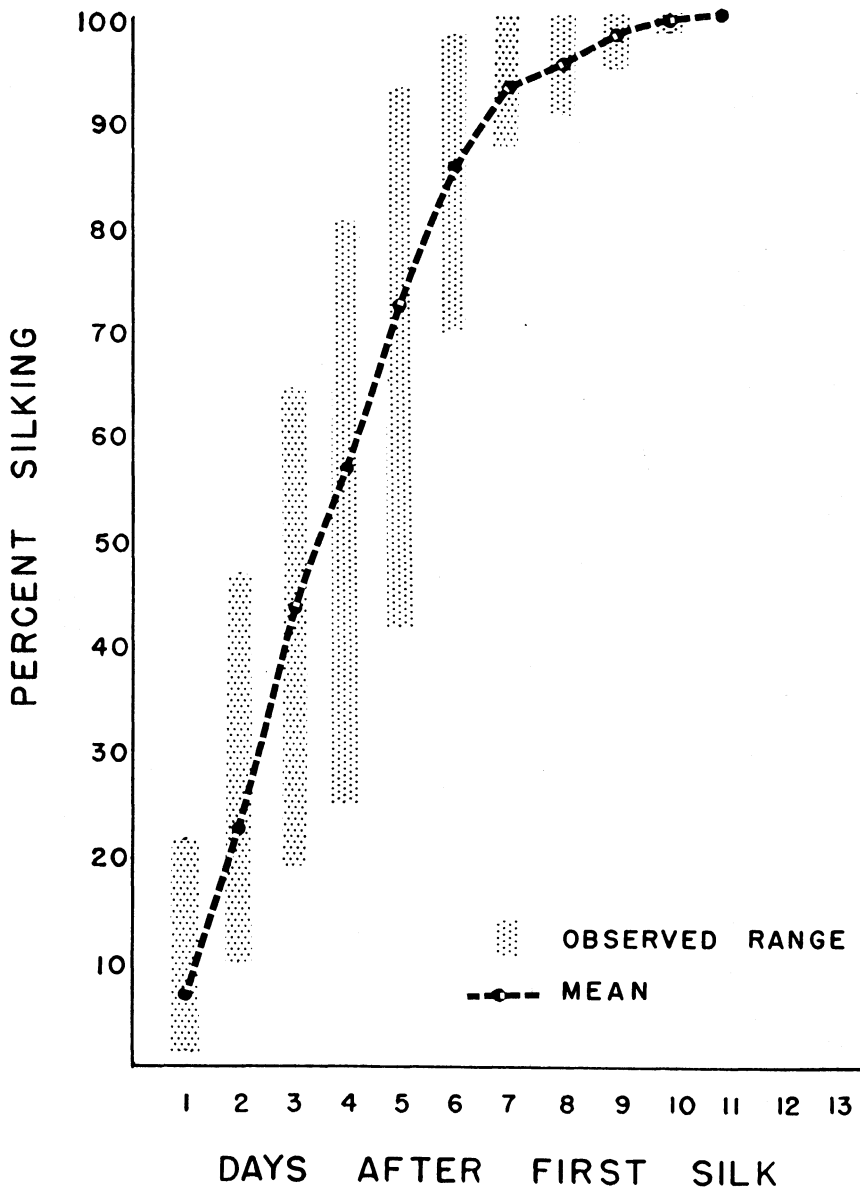


Fig. 1.—Mean silking rate and range of 4 plantings of Seneca 60.

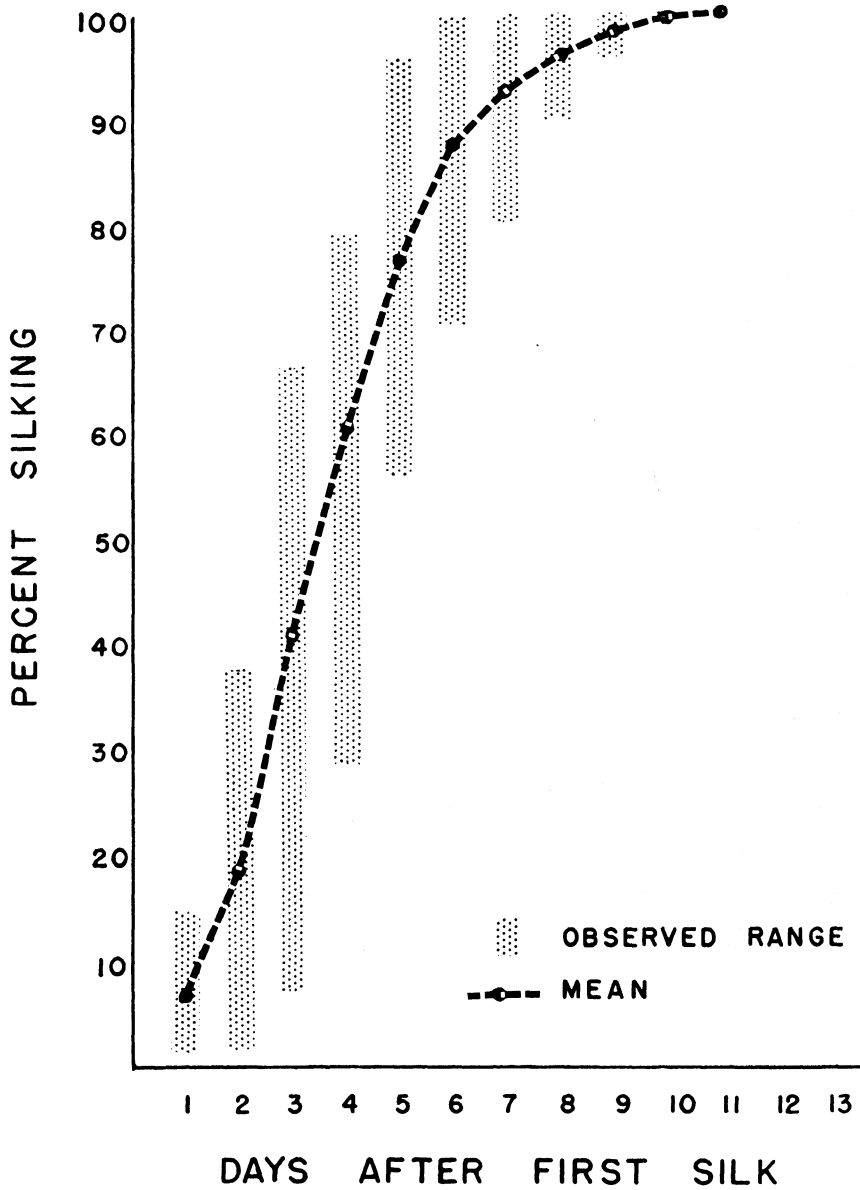


Fig. 2.—Mean silking rate and range of 12 plantings of North Star.

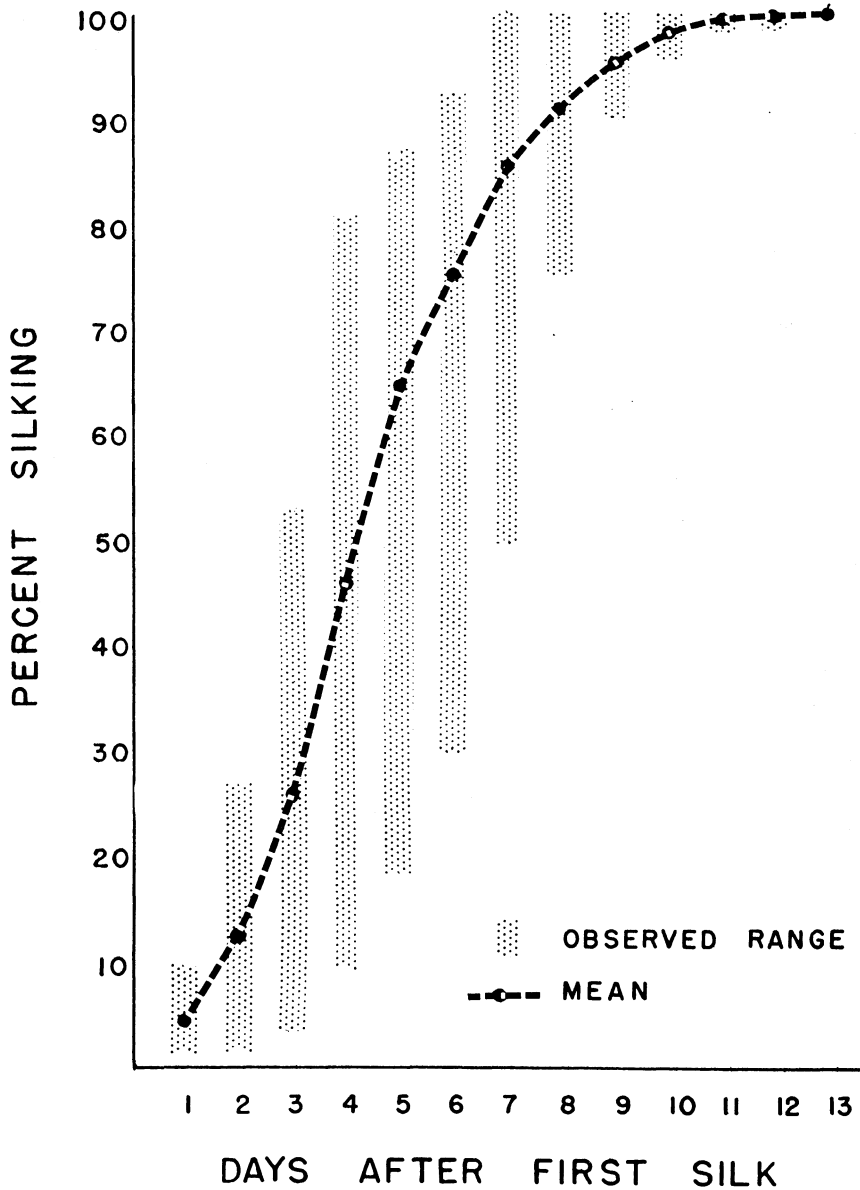


Fig. 3.—Mean silking rate and range of 10 plantings of Seneca Chief.

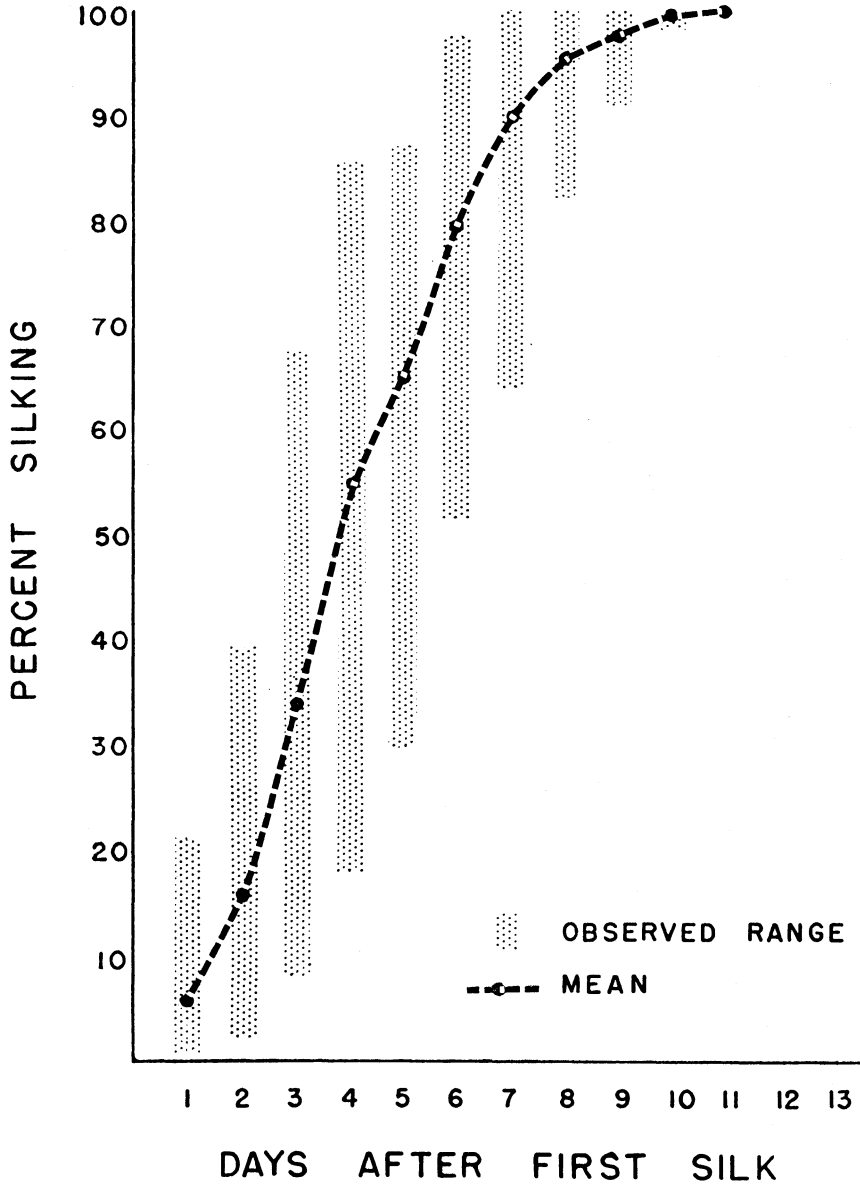


Fig. 4.—Mean silking rate and range of 11 plantings of Golden Cross Bantam.

TABLE 1.—Percent of Plants Bearing Silk. All Varieties and Plantings

Days from first silk	Silking Rate		
	Minimum*	Mean	Maximum
1	1.1	4.3	14.3
2	1.1	17.0	36.7
3	2.2	35.8	66.3
4	8.9	53.7	79.6
5	17.8	69.9	96.9
6	30.0	82.0	100.0
7	50.0	90.3	
8	75.6	94.7	
9	90.0	97.7	
10	95.6	99.3	
11	97.8	99.7	
12	97.8	99.9	
13	100.0	100.0	

*Minimum silking rate is defined as rate of silk appearance requiring greatest time from initiation to completion.

Silk growth, as measured by weight of silk mass, following initial appearance was investigated in two plantings each of Seneca Chief and Golden Cross Bantam. Silks were tagged on appearance until a total of 60 were marked in each plot. The silks appearing on a given day were collected when 1, 2, 3, 4, 5 and 6 days old, in equal numbers as far as possible. Thus, silks of a given age included individual silk masses that developed at different times during the silking period. At collection, the ears were husked and the entire silk mass removed. Ten silk masses were composited for each age and this sample dried to constant weight. A growth curve was constructed from these weights and the maximum point determined. This point indicates the day maximum weight was attained and is assumed to correspond closely with cessation of silk growth.

In these four plots silks grew most rapidly in the 3 or 4 days following their appearance and reached a maximum weight in 4.0 to 6.2 days (Table 2). Over 90 percent of the silks had wilted by the fourth day after appearance and all silks had wilted by the fifth day. It appears then that growth is arrested or greatly diminished at the time of wilting.

TABLE 2.—Silk Weight and Percent Wilted Silks

Silk age in days	Seneca Chief		Golden Cross Bantam	
	Planting 1	Planting 2	Planting 1	Planting 2
	Grams			
1	1.28	1.62	1.37	1.45
2	1.60	1.69	1.54	1.56
3	1.81	1.76	1.66	1.65
4	1.91	1.79	1.73	1.71
5	1.90	1.76	1.76	1.75
6	1.78	1.70	1.74	1.77
	Percent Wilted Silks			
1	0	0	0	0
2	8.3	14.4	4.3	10.0
3	55.9	66.6	41.7	50.0
4	91.6	94.4	90.6	92.0
5	100.0	100.0	100.0	100.0
	Days to Maximum Weight			
	4.4	4.0	5.1	6.2

In all varieties and plantings, silk age at the time approximately 95 percent had wilted averaged 4 days for the 3480 silks observed, with a range of 2 to 5 days (Table 3).

TABLE 3.—Percent of Wilted Silks. All Varieties and Plantings

Silk age in days	Wilting Rate		
	Minimum	Mean	Maximum
1	0	1.7	19.4
2	3.1	24.8	91.8
3	44.8	70.6	100.0
4	74.0	95.1	
5	95.8	99.4	
6	99.0	99.9	
7	100.0	100.0	

The critical period in corn earworm control, when it is especially difficult to maintain an effective insecticidal residue, apparently extends from the appearance of the first silks until completion of wilting. Comparison of the mean wilting rate for all plantings of each variety shows little difference, except that the very early Seneca 60 attained the 95

percent level 2 or 3 days before the other varieties (Table 4). For all varieties and plantings an average of about 10 days elapsed from initial silk until 95 percent of the silks had wilted, with a range of 7 to 13 days (Table 5).

To assure adequate insecticidal coverage during the entire silking period, yet avoid unnecessary applications, it seems advisable to adjust the spray schedule to each individual field according to silk development. Growers should bear in mind that these data are from small plots and that the silking period will be extended for a greater time in fields with less uniform conditions. At the same time, retarded plants which will not produce marketable ears at harvest should not be considered in terminating the spray schedule.

TABLE 4.—Mean Percent of Plants Bearing Wilted Silk

Days from first silk	Variety			
	Seneca 60	North Star	Seneca Chief	Golden Cross Bantam
1	7.3	0	0	0
2	23.4	0.6	0.5	0.2
3	43.6	6.7	3.4	4.4
4	57.4	20.0	12.8	13.3
5	72.7	36.3	24.3	28.1
6	86.0	57.0	46.1	45.4
7	92.5	71.8	60.3	61.8
8	95.3	84.7	73.1	75.2
9	97.9	91.7	83.6	87.5
10	99.5	95.7	90.9	94.9
11	100.0	98.7	95.0	98.5
12		99.8	97.7	99.7
13		99.9	99.2	100.0
14		100.0	99.9	
15			100.0	
No. of plantings	4	12	10	11

TABLE 5.—Percent of Plants Bearing Wilted Silk. All Varieties and Plantings

Days from first silk	Wilting Rate		
	Minimum	Mean	Maximum
1	0	0.1	0
2	0	1.5	30.6
3	0	6.0	45.9
4	1.1	16.7	72.4
5	2.2	30.9	76.5
6	8.9	50.9	91.8
7	15.6	66.2	98.0
8	27.8	79.0	100.0
9	44.4	88.5	
10	75.6	94.2	
11	82.2	97.4	
12	91.1	99.1	
13	96.7	99.7	
14	98.9	99.9	
15	100.0	100.0	