Research Report to Oregon Processed Vegetable Commission
1986

Title of Project: Evaluation of certain factors affecting yield and ear characteristics of sweet corn

Project Leader and Department: H. J. Mack, Horticulture

Project Status: Terminating, June 1987 (funded for 1986 growing season)

Project Funding by Commission: For this reporting period: $3,000. Funds were used for establishing and maintaining plots, harvest labor, land use charges and data analysis.

Objectives:

1. To determine the effects of planting dates and plant populations on yield and ear characteristics (especially length and tip-fill) of Jubilee sweet corn at the OSU Vegetable Research Farm.

2. To determine the relationship between plant populations and yield and ear characteristics in commercial plantings of sweet corn in grower fields.

Report of Progress:

Three plantings of Jubilee sweet corn were made on May 27, June 6 and June 17 at the OSU Vegetable Research Farm in which population density varied in 36-inch rows. In the May 27 planting (harvested August 23) there were five populations of 20.0, 22.5, 25.0, 27.5 and 30.0 thousand plants per acre, while in the June 6 planting (harvested September 8) and the June 17 planting (harvested September 23) populations were 22.5, 25.0 and 27.5 thousand plants per acre.

Data in Table 1 and the figure indicate that as plant populations increased from 22.5 to 27.5 thousand plants/A average yield of good, unhusked ears increased 9%, while ear length was decreased about 1%. There was only a slight or no reduction in tip-fill as populations were increased within the range.

There were no grower samples obtained in 1986 but in 1985, there appeared to be no definite relationship between plant populations and ear size. It is anticipated that grower samples will be taken in 1987 with no additional funding being requested from OVPC.

In another study, not funded by OVPC, a treatment in which ethephon spray was applied to sweet corn at .25 lb ai/acre at the 5-6 leaf stage (before tassel emergence) was compared to an untreated check and one in which tassels and upper portion of the plant were removed (topping). In the topping treatment, made 12 to 13 days after early silking, two leaves remained above the upper ear on the plant. Data in Table 2 show that yields of unhusked good ears for the topping treatment were reduced 10 and

8%, respectively, compared to the untopped check, for the two planting dates. Yields from the ethephon spray when compared to the check were reduced about 22% and 40%, respectively, in the two planting dates. Yield reduction was primarily from a lower number of ears produced per acre and reduction in ear size. The ethephon spray reduced height of plants about 12-13%.

Summary:

The above results on varying plant populations of sweet corn confirm earlier results which indicate that as populations of sweet corn are changed from about 22.5 to 27.5 thousand plants per acre yields can be increased about 5 to 10% with little change in ear size and length. Other grower practices and processor needs will influence optimum populations to be used for processing sweet corn.

Signatures:

Redacted for Privacy

Project Leader _____ _____

Redacted for Privacy

Department Head _____ _____

HJM/td

Table 1.
1986 Sweet Corn Planting Dates - Spacing

Population (1,000 plants/A)	Yield-tons/A: Total unhusked	Yield-tons/A: Good ears: Unhusked	Yield-tons/A: Good ears: Husked	Wt./ear (lbs.): Good-unhusked	Cobs/ton (no.)	Ear length (in.)	Tip fill (5-good; 1-poor)
Planting Date 1 May 27, Harvest August 28							
(1) 20.0	9.7	8.9	6.7	.83	2410	7.9	4.5
(2) 22.5	10.1	9.5	7.0	.87	2300	7.8	4.5
(3) 25.0	10.7	10.3	7.2	.86	2325	7.7	4.2
(4) 27.5	10.6	10.0	7.3	.81	2470	7.7	4.2
(5) 30.0	11.1	10.4	7.7	.81	2470	7.4	4.0
Planting Date 2 June 6, Harvest September 8							
(2) 22.5	9.3	8.4	5.9	.81	2470	7.6	4.2
(3) 25.0	9.5	8.9	6.3	.81	2470	7.6	4.2
(4) 27.5	10.2	9.2	6.6	.78	2565	7.6	4.2
Planting Date 3 June 17, Harvest September 23							
(2) 22.5	9.8	9.3	6.6	.87	2300	7.9	4.2
(3) 25.0	10.0	9.5	6.8	.89	2250	7.9	4.2
(4) 27.5	10.8	10.5	7.4	.88	2270	7.8	4.2

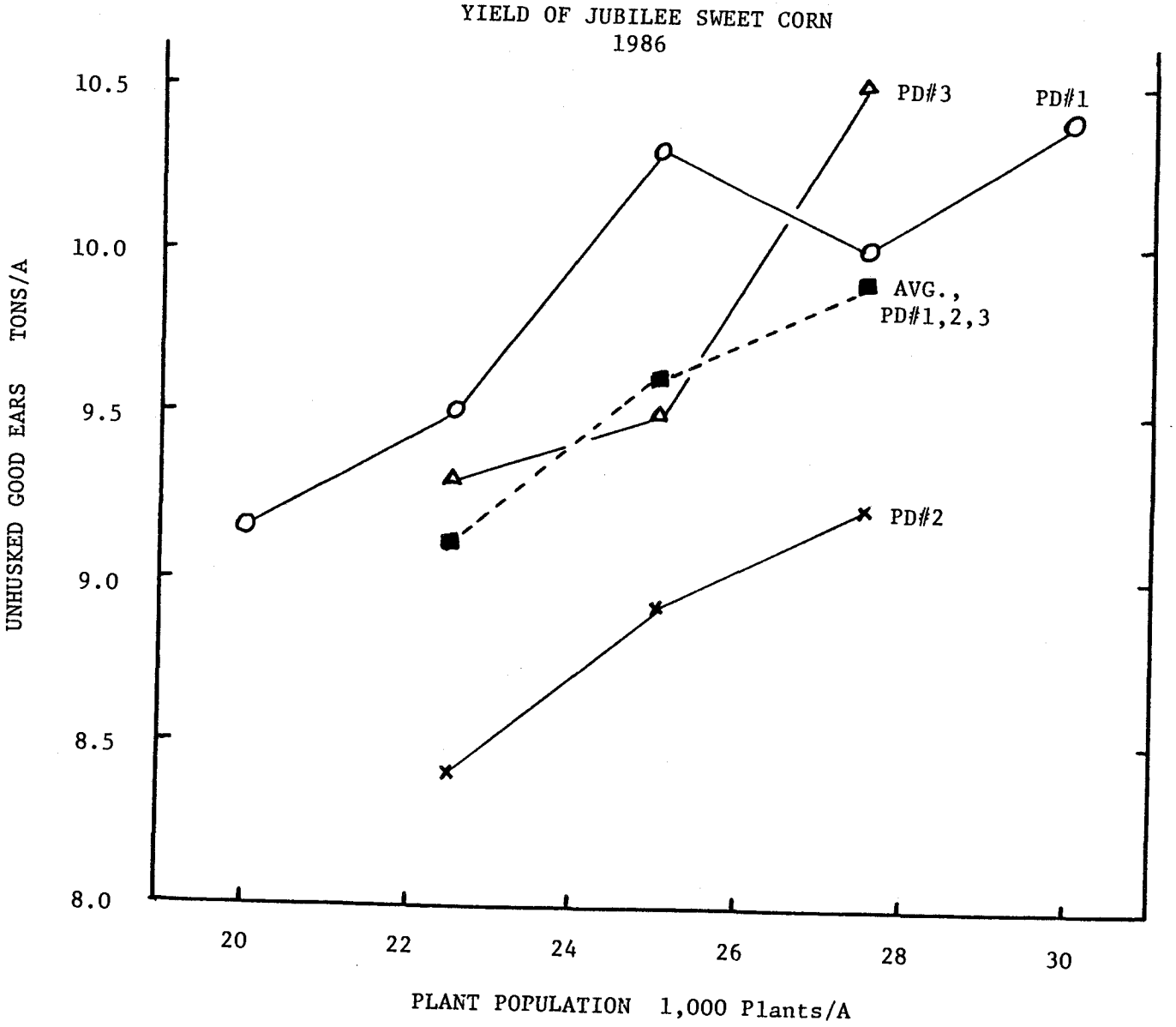
YIELD OF JUBILEE SWEET CORN
1986
UNHUSKED GOOD EARS TONS/A
10.5
10.0
9.5
9.0
8.5
8.0
PD#3
PD#1
AVG.,
PD#1,2,3
PD#2
20
22
24
26
28
30
PLANT POPULATION 1,000 Plants/A

Table 2.

1986 Effects of Mechanical Topping and Ethephon on Yield and Ear Characteristics of Jubilee Sweet Corn (Plant Population 25,000 plants/A)

	Treatment	Yield-tons/A			Wt./ear (lbs.)	Cobs/ton	Ear length	Tip fill
			Good ears					
		Total unhusked	Unhusked	Husked	Good-unhusked	(no.)	(in.)	(5-good; 1-poor)
	Planting Date 1 May 27, Harvest August 29							
(6)	Check-no topping	11.1	10.3	7.5	.85	2355	7.6	4.2
(7)	Mech. topping	10.4	9.3	6.9	.80	2500	7.6	4.0
(8)	Ethephon	8.3	8.0	6.1	.76	2630	7.3	4.2
	Planting Date 2 June 6, Harvest September 9							
(6)	Check-no topping	10.4	9.7	6.9	.83	2410	7.7	4.5
(7)	Mech. topping	9.6	8.9	6.3	.82	2440	7.6	4.2
(8)	Ethephon	7.0	5.8	4.4	.70	2855	7.4	4.5

INVESTIGATION OF ULV INSECTICIDES ON CORN

This study was designed to determine if Pounce (permethrin) or Pydrin (fenvalenate), when applied to corn at ULV rates during the pollen-shedding period would control the corn earworm (Helithois zea). In addition, the materials were evaluated for their effects on honey bees (HB) (Apis mellifera).

Field studies were conducted on corn at the Washington State University Irrigated Agriculture Research and Extension Center, Prosser, WA during 1986. A total of three fields (one Pounce, one Pydrin, and one untreated check), each one acre in size, were evaluated. The fields were isolated from each other by a distance of about 0.4 miles. The treatments were applied by airplane at 4-day intervals before 7 AM on 7/29, 8/3, 8/7, and 8/11 using 51 oz of water per acre.

One strong, healthy HB colony was placed adjacent to each field. Bee mortality was assessed using Todd dead bee traps attached to the front of each colony. Additionally, the strength and vigor of the colonies were checked before, during, and after the last treatments by opening the colonies and examining the adult and brood quality and quantity. Foraging behavior was assessed by maintaining a daily record on the number of HB foraging in the fields based on 8-minute counts of 600 ft of row recorded between 11:00 AM and 1:00 PM.

Corn earworm control was evaluated 5 days after the last application by recording the number of undamaged corn ears out of 200 randomly selected ears in each plot.

Results

Both insecticides significantly reduced corn earworm damage compared to the untreated check, though there were no differences between the treated fields (Table 1). Table 2 presents the honey bee mortality data.

Table 1. Effect of ULV insecticide applications to corn on corn earworm. Prosser WA. 1986.

Material	Rate	Percent Corn Earworm Infested Ears
Pounce 3.2 EC	0.2	9 A
Pydrin 2.4 EC	0.2	7 A
Untreated check	---	34 B

Means within a column followed by the same letter are not significantly different at $P \leq 0.5$, by Duncan's Multiple Range Test.

Table 2. Effect of ULV insecticide applications to corn on honey bees. Prosser, WA. 1986.

Material	No. dead HB/colony/day									
	7/29*	7/31	8/1	8/3*	8/4	8/5	8/7*	8/8	8/11*	8/12
Pounce EC	65	23	45	--	32	98	92	29	23	52
Pydrin 2.4 EC	82	30	24	--	74	380	198	36	42	60
Untreated check	1	3	1	--	41	131	2	1	2	0

* Application dates

CORN EARWORM DAY-DEGREE MODEL

This study was designed to test the Scott degree day model for corn earworm. The model was tested in four separate areas of Washington. In cooperation with Dan Suomi we tested the model at Prosser, WA.

Based on only one year's temperature records, we planted sweet corn on 29 April and 5 May. An accumulation of 1450 degree days (based on 55°F. starting 1 Jan) was expected on 15-17 July.

Results

Silking occurred between 17 and 22 July. 1580 degree days had accumulated by 31 July. No corn earworm larvae were present in our plots. These results indicate that if corn silks before 1500 degree days, corn earworm may not be a pest problem.