

January 1 - December 31, 1975

TITLE : Project 75-D - Varietal Resistance

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I. OBJECTIVES AND GOALS:

- A. To determine almond variety resistance to the the navel orangeworm.
- B. To investigate the means by which varieties are resistant to the navel orangeworm.
- C. To provide almond growers with an almond variety resistance rating to assist them in selecting suitable almond varieties.
- D. To provide information to allow a plant breeder to develop new almond varieties that would be more resistant to navel orangeworm than the present varieties.

II. ABSTRACT: Almond varieties were infested in the field and laboratory to determine their resistance to navel orange-worm. Factors of resistance, shell tightness, hull effects on navel orangeworm, speed of growth, size, and survival were studied. A Seal Quality machine was utilized to mechanically determine the tightness of almond shells.

Resistance of varieties was noted and compared with the laboratory and field data of navel orangeworm infestations. This research will assist plant breeders in evaluating new varieties for navel orangeworm resistance.

III. EXPERIMENTAL PROCEDURE:

Twenty-five almonds of each cultivar were tested with a Seal Quality Meter[®] for shell tightness. Measurements were in cc/min. of air leakage. Cultivars tested are in table 1.

Twenty-five almonds of each cultivar also were infested in the laboratory with navel orangeworms to assess their infestability.

Seventy-five almonds of each cultivar listed in table 2 were infested in the field to observe infestability of these varieties and antibiotic factors thereof.

Ten navel orangeworm eggs were placed in a split almond hull and the nut covered with a bag constructed of dialyses tubing. At harvest time, the nuts were removed and held in the laboratory for adult emergence.

IV. RESULTS:

Almond shell seal quality, infestation by navel orangeworm in the laboratory, and industry 1974 rejects are given in table 1. The seal quality, laboratory damage, and industry rejects correlate. Therefore it appears that the seal quality rating will be useful in testing varieties for shell resistance to navel orangeworm penetration.

Field infestation results are not complete at this time. Percentage of nuts damaged by the navel orangeworm in the three areas tested are in table 2. Hull damage did not correlate with the amount of nutmeat damage. Shell damage generally correlated with nutmeat damage.

Considerable progress has been made this year in providing information on the degree of resistance cultivars presently contain.

Research into almond cultivar resistance to navel orange-worm has led to a method of mechanically determining the seal quality of the shell. This seal quality gives an indication of resistance to the navel orangeworm and allows the researcher to determine where the shell is structurally weak.

Further research is continuing on the 1975 nut crop which will give additional information on year to year variations of the shell. The number of cultivars tested is being expanded this year and should be further expanded to provide the growers and plant breeders with a comparative resistance so that they may select the more resistant varieties.

Further research to determine other factors of resistance should be continued. These should include hull characteristics that may affect insect growth, speed of development, reproductive capacity, and moth attraction to the nut.

	Seal Quality (Leakage cc/min)	Navel orangeworm percent of Nutmeats Damaged Laboratory	Percent Industry Rejects
Marchena	7	2.8	-
Mission	11	0.0	1.15
Peerless	22	2.8	0.33
Davey	28	-	2.05
Emerald	77	12.0	1.66
Mono	94	-	-
Ruby	134	14.8	1.64
Yosemite	182	1.2	-
Neplus	258	50.4	3.57
Ballico	330	-	3.50
Nonpareil	537	37.2	4.19
Thompson	752+	-	3.90
Merced	746+	-	6.23
Kern Royal	800+	68.0	-
Jordanolo	800+	-	7.46
Drake	800+	-	6.69
IXL	800+	-	8.82
Norman	800+	-	-
Carmel	800+	-	-

Variety	Nutmeat	Shell	Hull
Bakersfield			
Nonpareil	77	69	60
Norman	67	63	64
Mono	38	24	52
Le Grande	31	29	45
Neplus	25	17	47
Yosemite	25	39	54
Fresno			
Nonpareil	63	52	54
Thompson	59	58	48
Ruby	42	33	68
Neplus	41	37	44
Mission	9	9	56
Ballico			
Ferrari	92	88	79
Thompson	76	43	76
Drake	57	51	48
Ballico	46	46	83
Neplus	44	36	39