PRUNE FLOWER EVALUATIONS

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ABSTRACT

Weather factors during bloom and early fruit development stages affected the crop in many of the experimental orchards, leaving a limited fruit set. Although there are trends showing that having a higher % stigmas equal or below the anthers results in higher % fruit set, this one year's data had too many temperature factors to draw any effective results. Bagged limbs that eliminated bee activity had very low sets, indicating that bees are essential for fruit set.

OBJECTIVE

French prunes, although self compatible, often have the stigma (pollen receptor) higher than the anthers (pollen producers), thus reducing the likelihood of self pollination. Raised stigmas are common on many plant species and are nature's way of increasing cross-pollination, and reducing self pollination. Prune orchards with self-compatible French prunes will benefit from the presence of pollinators since the stigma is often elevated.

It has been shown that prune sets vary by districts in California. Tehama County historically gets 18%, Sutter/Yuba 21% and the San Joaquin Valley 30%. Most years, the winter chilling hours are identical and the air temperature during bloom and during the growing season are similar. This set difference results in large fruit sizes and small tonnages in the north, and small fruit sizes and higher tonnages in the south.

The question arises are these differences possibly due to stigma--anther relationships. Also, do orchards vary from year to year with the position of the stigma to the anthers. Since there are a varied genetic source of French clones in commercial orchards, are orchards that are consistently high yielding due to flower structure or other environmental factors.

The objective of this experiment was to survey various orchards in each district to identify possible differences in flower structure for the next three years, also to show if flowers with a higher % of stigma above the anthers set more fruit, and to evaluate the need of bees on fruit set.

PROCEDURE

Four orchards with 10 trees each were selected from 3 prune districts: Tehama, Sutter/Yuba, and Merced.

In each orchard 10 limbs were bagged with mesh screen to eliminate bees, and 10 limbs were not bagged for a comparison.

Total Experiment

3 districts x 4 orchards = 12 orchards
12 orchards x 10 limbs each = 120 limbs
120 limbs bagged mesh screen
120 limbs non-bagged

Data

At full bloom, each flower on a limb was evaluated (50-150 flowers/ limb) for location of stigma to the anthers and recorded as number of flowers with stigmas above, equal, and below the anthers.

In late May, fruit counts were made and % set determined.

RESULTS

Although there are some trends showing that having a higher % stigmas equal or below the anthers results in higher fruit set, results this year are variable. Due to the hot weather during bloom, the prune set was limited, also a frost early in the season affected fruit set on the lower portion of the trees where the evaluations were being made. The prolonged heat that we had during and after bloom might have had an effect on the set of the bagged limbs due to temperature extremes in the mesh bags.

In 1986, the same tagged limbs in each orchard will be evaluated to see if the structure of these flowers are the same for every year or do they alternate. Hopefully, we can observe these orchards for several more years so that conclusions can be made and experiments set up to have the Prune Industry take advantage of flower structure either through a breeding program or predictory crop.

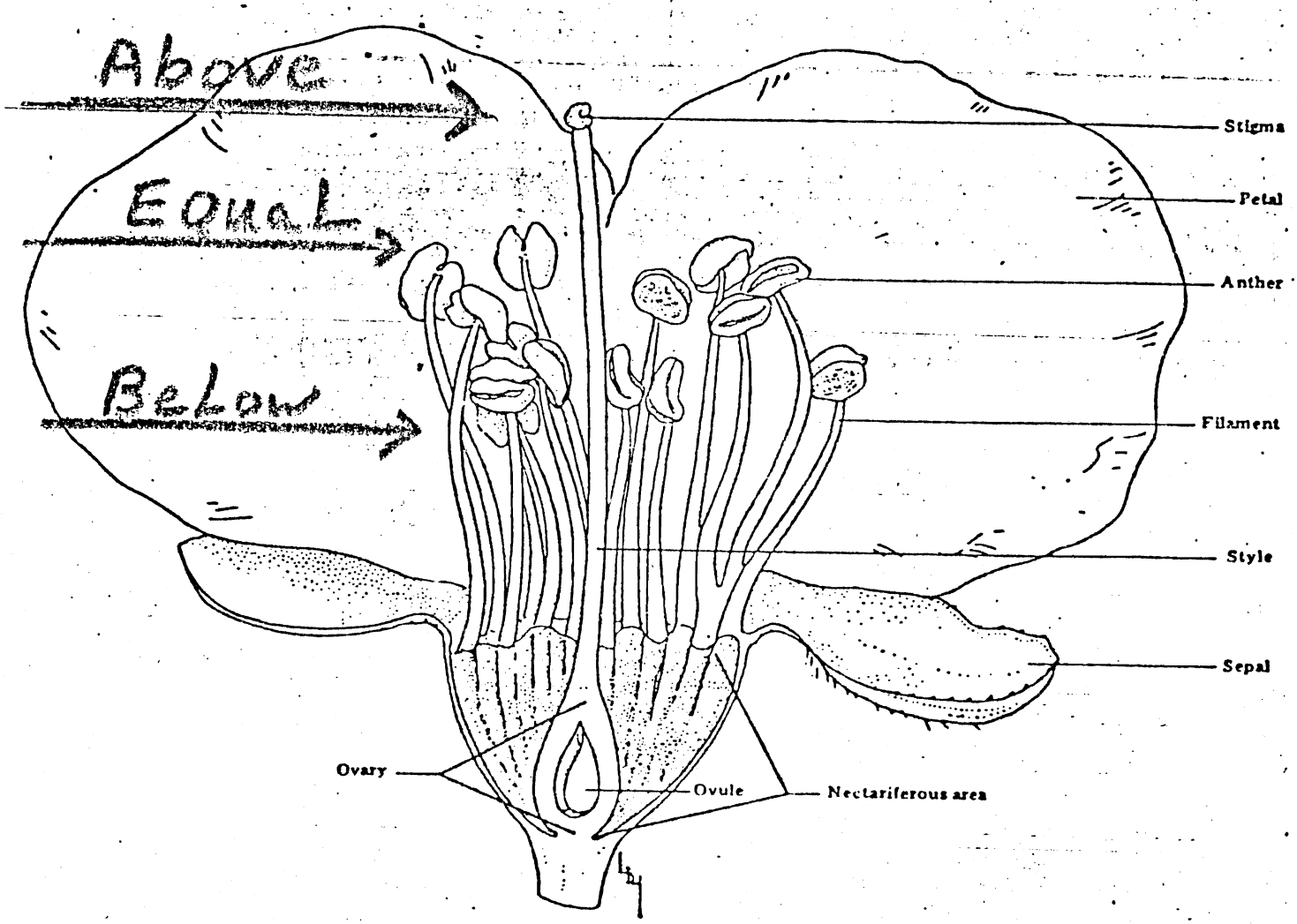
RELATIONSHIP OF STIGMA TO ANTHERS

COUNTY	GROWER	Bagged Limb % Stigmas ABOVE	EQUAL	BELOW	INDEX	% SET	Non-Bagged Limb % Stigmas ABOVE	EQUAL	BELOW	INDEX	% SET
Tehama	Monastory	61	34	5	1.44	8.1	70	26	4	1.34	41.7
	Boitano	79	18	3	1.24	2.3	82	15	3	1.21	38.6
	Ballard-Corral	80	15	5	1.25	1.2	83	14	3	1.20	34.6
	Ballard-Bee	70	24	6	1.36	1.6	86	12	2	1.16	22.4
		(73)	(22)	(5)	(1.32)	(3.3)	(80)	(17)	(3)	(1.23)	(34.3)
Sutter	Micheli	49	36	15	1.66	2.3	49	36	15	1.66	38.2
	Sowden	71	25	4	1.33	0.9	61	28	11	1.50	11.4
	Kells	67	29	4	1.37	0.0	65	29	6	1.41	4.2
	Hatamiya	88	10	2	1.14	0.7	94	6	0	1.06	1.8
		(69)	(25)	(6)	(1.38)	(1.0)	(67)	(25)	(8)	(1.41)	(13.9)
Merced	V-Whelan	81	16	4	1.25	0.0	81	17	2	1.21	27.0
	Kamanga	80	18	2	1.22	0.4	87	12	1	1.14	21.1
	V-kibby	72	21	7	1.35	0.1	81	15	4	1.23	16.3
	Donny	84	13	3	1.19	0.0	86	11	3	1.17	14.5
		(79)	(17)	(4)	(1.25)	(0.1)	(84)	(14)	(2)	(1.19)	(19.7)

Index 1 = Stigma above anthers
2 = Stigma equal anthers
3 = Stigma below anthers

Data
Average of 10 limbs/orchard

Longitudinal section of French prune flower showing raised stigma. (from USDA Handbook No. 496, Insect Pollination of Crops, 1976).



ALTERNATE PRUNING TRIAL
Viktoria Orchard - Merced County
Maxwell Norton and James Yeager

TREATMENTS	COLOR CODE	FRESH YIELD (LBS) PER TREE	DRY AWAY	DRY YIELD (LBS) PER TREE	DRIED TONS PER ACRE*	DRIED CT/LB	% SCREEN SIZE DISTRIBUTION 30	26	24	24>
Grower		128	2.73	47	1.76	50	61	27	6	6
Moderate	Red	119	2.60	46	1.73	45	74	18	4	4
Centers/ Light Thin	Blue	182	2.77	66	2.48	51	58	29	8	5
None	White	227	2.83	80	3.00	65	25	44	16	15

Data Average of 14 Replications

* 75 Trees/acre

	Treatments				
Color Code	1985	1986	1987	1988	1989
Red	Mod	Mod	Mod	Mod	Mod
Blue	Centers	None	Centers	None	Centers
White	None	Centers	None	Centers	None