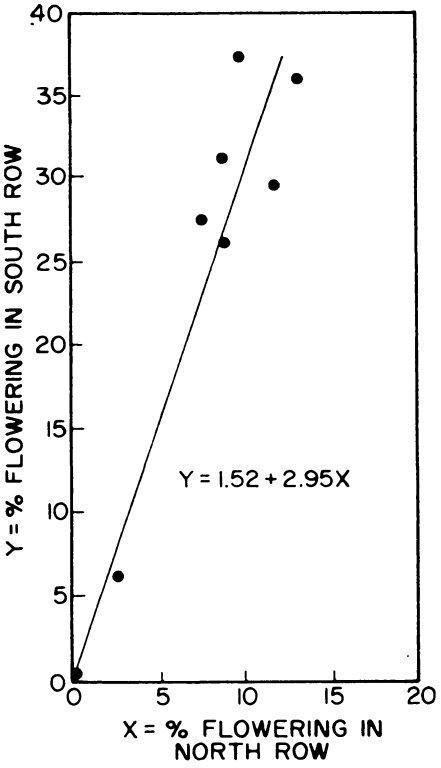

Fig. 1. Relation between premature bolting in north and south paired rows in eight onion varieties, Vicosa, Minas Gerais, Brazil.

been explained on the basis of differing soil temperature and sunlight relations (1). Similarly, citrus and mango tree quadrants based on the cardinal points of the compass indicated increased quality and productivity on the sunward side (4,6). The studies of Thompson and Smith (5) and Heath and Holdsworth (2) indicate that cold temperature is the critical factor in onion flower induction. Premature bolting in onions on the cool side of beds (presumably the north side) in California is noted by Shadbolt, McCoy and Little (3) in a study of bed orientation and soil temperature. The differential flowering response observed in the present study can be explained by the shading effect of the north on the south row, the north being the sunward side in the Southern Hemisphere. The declination of the sun in Vicosa (lat. 20′ 4″ S) during the winter (June to September) could very well produce this effect.

Row orientation could be a factor in selection efficiency for bolting resistance in onion where the planting pattern creates a double row. This can be overcome by planting rows in a north-south direction.

Table 2. Effect of row orientation and field position on premature bolting in 3 varieties of onion (Baia Periforme, Sintese 13 and 14), Vicosa, Minas Gerais, Brazil, 1963.

Premature bolting in percent[1]			
Row Orientation	Field position East	West	Weighted average (N-S)[1]
North	5.94	5.41	5.67
South	13.63	13.20	13.41
Weighted average (E-W)	9.54	9.29	

[1] Difference in N-S flowering highly significant

Literature Cited

1. Eno, Charles F. and P. J. Westgate. 1957. Row orientation and its effect on the growth of celery and certain soil factors. *Florida State Hort. Soc.* 70:115-120.
2. Heath, O. V. S. and M. Holdsworth. 1948. Morphogenic factors as examplified by the onion plant. *Symp. Soc. Exp. Biol.* 2:326-350.
3. Shadbolt, C. A., O. D. McCoy, and M. Little. 1961. Soil temperature as influenced by bed direction. *Proc. Amer. Soc. Hort. Sci.* 78:488-495.
4. Simao, Salim. 1960. Estudos da planta e do fruto da mangueira. (Studies on the plant and fruit of mango.) Tese de Concurso. Escola Superior de Agricultura "Luiz de Queiroz" da Universidade de Sao Paulo, Brazil. 167p. (In Portuguese, English summary.)
5. Thompson, H. C. and Ora Smith. 1938. Seedstalk and bulb development in the onion (*Allium cepa* L.) Cornell Univ. Agr. Exp. Sta. Bull. 708.
6. Wallace, A., S. H. Cameron, P. A. T. Wieland. 1955. Variability in citrus fruit characteristics, including the influence of position on the tree and nitrogen fertilization. *Proc. Amer. Soc. Hort. Sci.* 65:99-108.

Effect of Storage and Stage of Flower Development on Viability of Pepper Pollen

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This experiment was initiated to obtain information on short term storage of pepper (*Capsicum frutescens* L.) pollen and to determine the effect of pollen maturity on fruit-set and seed production in peppers. Storage of pepper pollen for approximately 30 days is often desired in breeding and improvement programs for this crop. Hirose (4) concluded that differences in bud pollinations among pepper, eggplant, and tomato were due to differences in viability of their pollen. Erwin (3) reported that periods of both anthesis and dehiscence were relatively short for several varieties of pepper. Pollen longevity in general increases with decreasing temperature and decreasing humidity. Pal and Singh (6) reported that the longevity of eggplant pollen under open conditions in India was 1 day in summer and 3 days in winter. Natural cross-pollination in peppers was reported by Markus (5) to occur mainly between the hours of 7 and 11 in the morning.

For the short term pollen storage experiment, 200 flower buds were selected on healthy plants of the pepper cultivar, Truhart Perfection (1). Anthers were removed from these buds between 7:00 am and 8:00 am on August 5, 1965 before dehiscence occurred and placed in a glass beaker. After thorough mixing, they were divided into 3 lots of approximately 300 anthers each, placed in separate Petri dishes and covered. The following storage treatments were employed: room storage at 22-26°C and relative humidity of 50-70%; household refrigerators with 2-6°C and relative humidity of 40-50%; household refrigerator with 2-6°C and pollen over $CaCl_2$. Pollen from each storage treatment was used to pollinate 5 previously emasculated and bagged flowers on each of 8 Truhart Perfection plants. Pollinated flowers were covered with a special cone (2) to prevent contamination by foreign pollen. Pollen viability was based on the percentage of pollinated flowers that set fruit and on the number of seeds produced per fruit. The number of seeds produced was also recorded for open pollinated fruits from some of the test plants at each period, for comparison with the controlled pollinations.

The viability of pepper pollen from flower buds at 6 stages of development

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was determined (Fig. 1). These flower bud stages were: 2 and 1 day prior to anthesis; the day of anthesis; and 1, 2, and 3 days after anthesis. Pollen at each of these stages of development was used to hand pollinate 5 flowers on each of 4 plants. Fruit-set and number of seeds per fruit were determined.

Pollen stored in a covered Petri dish at room temperature produced successful pollinations for 2 days but no longer (Table 1). Pollen remained viable up to 10 days when refrigerated at 2-6°C and relative humidity of 40-50%, and up to 50 days at 2-6°C over $CaCl_2$. Open pollinated fruits had more seeds per fruit than emasculated, hand pollinated fruits on the same plant, which might be a factor in the lower seed production.

No successful pollinations were obtained using pollen taken from flower buds 2 days prior to anthesis or pollen from flowers 3 days after anthesis. Pollen collected from flowers the day of anthesis produced maximum fruit-set; that collected 1 day prior to, or 1 day after anthesis resulted in a reduction of fruit-set and seed production. Hirose (4) reported a low level of seed production in pepper using pollen 4 days after anthesis. He stated that temperature had an influence not only on pollen germination but also on pollen development.

Fig. 1. Pepper flower buds: left, 2 days prior to anthesis; center, 1 day prior to anthesis; and right, the day of anthesis.

Table 1. Effect of pollen storage on fruit-set and seed production in pepper, 1965.

Storage treatment	Storage period days	Fruit-set %	Seeds per fruit	Seeds per fruit OPF[a]
22-26C	1	25	84	170
50-70% R.H.	2	10	42	214
	4	0	0	190
	6	0	0	179
2-6C	1	55	104	192
40-50% R.H.	2	45	121	205
	4	50	97	201
	6	30	113	220
	8	15	78	175
	10	5	90	182
	12	0	0	202
2-6C	1	50	125	169
over $CaCl_2$	2	45	116	218
	4	60	128	131
	8	25	89	137
	10	20	104	168
	12	10	75	147
	50	5	88	221

[a] OPF — open pollinated field fruits.

Literature Cited

1. Cochran, H. L. 1943. The Truhart Perfection pimiento. *Ga. Agr. Exp. Sta. Bull.* 224.
2. Dempsey, A. H. 1961. Improved technique for controlled pollinations of peppers. *Proc. Amer. Soc. Hort. Sci.* 77:449-551.
3. Erwin, A. T. 1931. Anthesis and pollination in *Capsicum*. *Proc. Amer. Soc. Hort. Sci.* 27:309-310.
4. Hirose, Tadahiko. 1965. Fundamental studies on the breeding of pepper. *Kyoto Perfectural University Tech. Bull.* No. 2.
5. Markus. F. 1964. Cross fertilization tests with spice paprika. *Int. Evk Kecskeinet Bibl.* 6:119-123. Original not seen.
6. Pal, P. B. and H. B. Singh. 1943. Floral characters and fruit formation in eggplant. *Indian Journal. Genetics and P. C. Breeding* 3(1):45-48.

The Burgundy Sport: Further Evidence of the Chimeral Nature of Pigmented Grapefruits

By E. O. Olson[1], J. W. Cameron[2], and R. K. Soost[2]

Recently, we proposed (1) that the pink grapefruit varieties, Thompson and Foster, are periclinal chimeras, carrying factors for color in certain histogenic layers. Lycopene and other carotenes are the pigments involved (4). In the Thompson, histogenic Layer I (L-I) should carry the factor and Layer II (L-II) should not, since color is present in the juice vesicles but not in the rind and since nucellar seedlings, evidently derived from Layer II, show no red pigment in their fruits. Thompson was derived as a sport from the white Marsh grapefruit (6); the two varieties seem essentially identical except for fruit color.

In 1954, a new pigmented grapefruit called Burgundy was described (5). Its characters were further studied in 1959 (2). The color characters of Burgundy indicate that it, too, is a chimera. Our data from fruiting seedlings (apparently nucellar) of Burgundy support this theory.

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