Technical Papers

Effect of 3-Chloro-Isopropyl-N-Phenyl Carbamate on Abscission of Young Fruits of Peach

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Peach thinning experiments with sprays containing 3-chloro-isopropyl-N-phenyl carbamate (3-Cl-IPC) conducted during the 1952 season indicate that this compound offers promise as a new thinning agent. These preliminary results are believed to be of sufficient interest to warrant further trials of this and related carbamates for thinning peaches. The need for a reliable chemical thinning agent for peaches is shown by the work of other investigators (*1, 2*).

In the present experiments peach trees that had currently set a heavy crop were used. Two adjacent branches of approximately equal size on each tree were used; one received the spray while the other served as the control. Afterglow and Hiley varieties were sprayed with 200 ppm aqueous concentration of 3-Cl-IPC on May 16, 1952, approximately 30 days after full bloom; Halehaven, Laterose, Raritan Rose, and Triogem peaches, and Flaming Gold nectarines were sprayed with a 500 ppm concentration on May 28, approximately 42 days after full bloom. Technical grade 3-Cl-IPC was dispersed in water by dissolving it in Tween 20, used at 0.5% in all sprays. A 3-gal pressure sprayer was used to wet all parts of the branches thoroughly with the sprays. Pressure tests to determine maturity of fruits were made with a Magness-Taylor pressure tester fitted with a 5/16-in. plunger.

Fruit thinning effects were evident on sprayed branches of Afterglow and Hiley varieties one week after treatment (200 ppm 3-Cl-IPC applied 30 days after full bloom), when many treated fruits were shriveling. At this time the effect of the spray seemed too severe and the concentration too great. Records at harvest showed that this was the case (Table 1). Hiley fruits were drastically overthinned by the spray, only 18% of the original number being on the tree at harvest. Natural thinning during the June drop reduced the drop of this variety to about the optimum (46% at harvest) on the control limb. The variety Afterglow also was overthinned by the chemical.

Application of 3-Cl-IPC at 500 ppm concentration approximately 42 days after full bloom caused about half of the fruits of Laterose, Raritan Rose, and Triogem varieties to abscise, leaving what appeared to be about the optimum numbers for the limbs to bear (Table 1). Halehaven peach lost 39% of its crop through natural causes, and the spray thinned the crop even further so that only 36% of the fruits remained on the tree at harvest. Flaming Gold nectarine also was overthinned by the spray. At harvest, fruits of all varieties except Halehaven averaged larger on sprayed branches than on unsprayed ones. Pressure tests at that time showed that the treated fruits matured earlier and were softer than the controls (Table 1).

TABLE 1

FRUIT THINNING INDUCED BY SPRAY APPLICATION OF 3-CHLORO-ISOPROPYL-N-PHENYL CARBAMATE (3-CL-IPC) TO INDIVIDUAL BRANCHES OF 6 VARIETIES OF PEACH AND 1 VARIETY OF NECTARINE

Variety	Treatment	No. of fruits present at start	Percentage remaining at harvest	Av size of fruit (mm)	Av pressure-test reading (firmness [lb])
Afterglow	Control	122	76	202	15.8
	3-Cl-IPC*	145	37	227	9.5
Halehaven	Control	38	61	175	21.3
	3-Cl-IPC†	64	36	177	7.5
Hiley	Control	136	46	191	10.2
	3-Cl-IPC*	101	18	204	9.5
Laterose	Control	102	92	186	9.3
	3-Cl-IPC†	256	52	210	5.4
Raritan Rose	Control	121	83	174	13.1
	3-Cl-IPC†	165	50	193	3.0
Triogem	Control	142	100	159	17.0
	3-Cl-IPC†	128	46	172	14.1
Flaming Gold (nectarine)	Control	140	82	—	—
	3-Cl-IPC†	192	22	—	—

* Applied as an aqueous spray at 200 ppm concentration approximately 30 days after full bloom.

† Applied as an aqueous spray at 500 ppm concentration approximately 42 days after full bloom.

Under the conditions of these experiments young expanding leaves of peach and nectarine showed no apparent discoloration or injury due to the spray applications. In contrast, a thinning spray of naphthalene acetic acid applied at 30 to 40 ppm concentration generally caused moderate to severe epinasty of young developing peach leaves, a week or more being required for recovery.

Certain inherent characteristics of 3-Cl-IPC should be considered in evaluating it further as a thinning agent. At moderately high temperatures the chemical evaporates rather rapidly (*3*); thus the response obtained may vary considerably, depending upon the amount applied and the temperature. Half as much was required to keep potato tubers dormant at 50° to 60° F as at 70° to 75° (*4*). Stage of development may also strongly influence the results, since carbamates affect cell division (*5*). Extensive tests with

carbamates as herbicides indicate that some kinds of plants are more readily affected than others (*6–8*). Preliminary experiments to be reported elsewhere indicate that young fruits of apple are not as sensitive to 3-Cl-IPC as are those of peach.

Although extensive tests on animal toxicity have not been conducted, laboratory tests with small animals carried out by the Industrial Hygiene Foundation of America, Inc., Pittsburgh, Pa., for the Columbia-Southern Chemical Corporation, show that 3-Cl-IPC and the parent carbamate are relatively nontoxic.[1]

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Cells with Metachromatic Cytoplasmic Granules in the Stroma of Human Chorionic Villi

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In the course of reinvestigating the histological characteristics of the human placenta with the use of various histochemical techniques, certain cells in mesodermal cores of chorionic villi were found to contain metachromatic, eosinophilic granules in their cytoplasm. These seemed to us to be of such interest as to warrant some discussion.

These granular cells were found in the villi of all of 14 placentas examined, ranging in age from 3.5 weeks to term. All material in which they were demonstrable was fixed either in 4% basic lead acetate, or 5% trichloracetic acid, after which paraffin-embedded sections were cut at 5 μ and stained with toluidine blue to demonstrate metachromasia, and with Wright-Giemsa stain to demonstrate eosinophilia. These specific granules were most abundantly demonstrated after basic lead acetate fixation. They were always found in villous stroma but rarely encountered in the basal chorion, placental septa, or amnion.

The granule-bearing cells were quite large, ranging from 12 to 18 μ in diameter. They were generally

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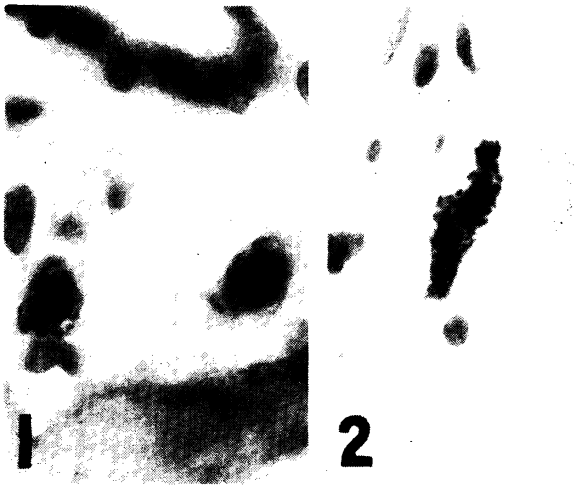

FIG. 1. Portion of a chorionic villus from a term placenta showing two large rounded cells with coarse, eosinophilic cytoplasmic granules in the stroma. Fixation in 4% basic lead acetate, Wright-Giemsa stain. × 1140.

FIG. 2. Villous stroma from a term placenta showing a single cell packed with coarse metachromatic granules. Fixation in 4% basic lead acetate; toluidine blue stain. × 1140.

roughly spherical in shape (Fig. 1) but in many cases exhibited long processes (Fig. 2). The cell membranes quite indistinct, the limits of the cytoplasm being frequently demarcated by the contained granules (Figs. 1–4). The intergranular cytoplasm sometimes seemed to exhibit metachromasia, which was thought to be due to solubility of the granules. The nuclei were spherical or bean-shaped and homogeneously basophilic, on which background were superim-

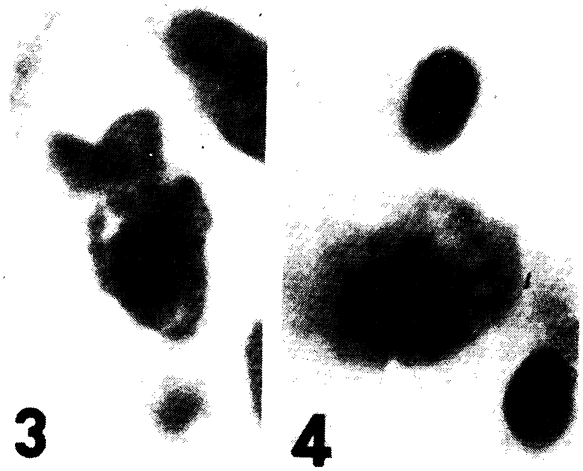

FIG. 3. The surface trophoblast and underlying stroma from a term placenta with a large cell containing very coarse eosinophilic cytoplasmic granules and a condensed diffusely stained nucleus. Fixation in 4% basic lead acetate; Wright-Giemsa stain. × 2190.

FIG. 4. Another large cell in a villus from a placenta of 6 weeks, containing numerous coarse cytoplasmic granules, which stained metachromatically with toluidine blue. Some cytoplasmic metachromasia is apparent. Fixation with 4% basic lead acetate. × 2190.