

Research Note

NOTES ON INSECT PESTS OF SOURSOP (GUANÁBANA), ANNONA MURICATA L., AND THEIR NATURAL ENEMIES IN PUERTO RICO¹

Soursop or guanábana is a cultivated small evergreen tree which attains 6 to 7 meters in height and 21 cm in trunk diameter. The tree is common to the south coast and lower slopes of the Central Cordillera

of Puerto Rico. It is best known by its large and aromatic green fleshy fruits, which are 15 to 20 cm long and 10 to 11 cm wide, elliptical or egg-shaped, with many curved fleshy spines. The fruit weighs up to 2 kilos

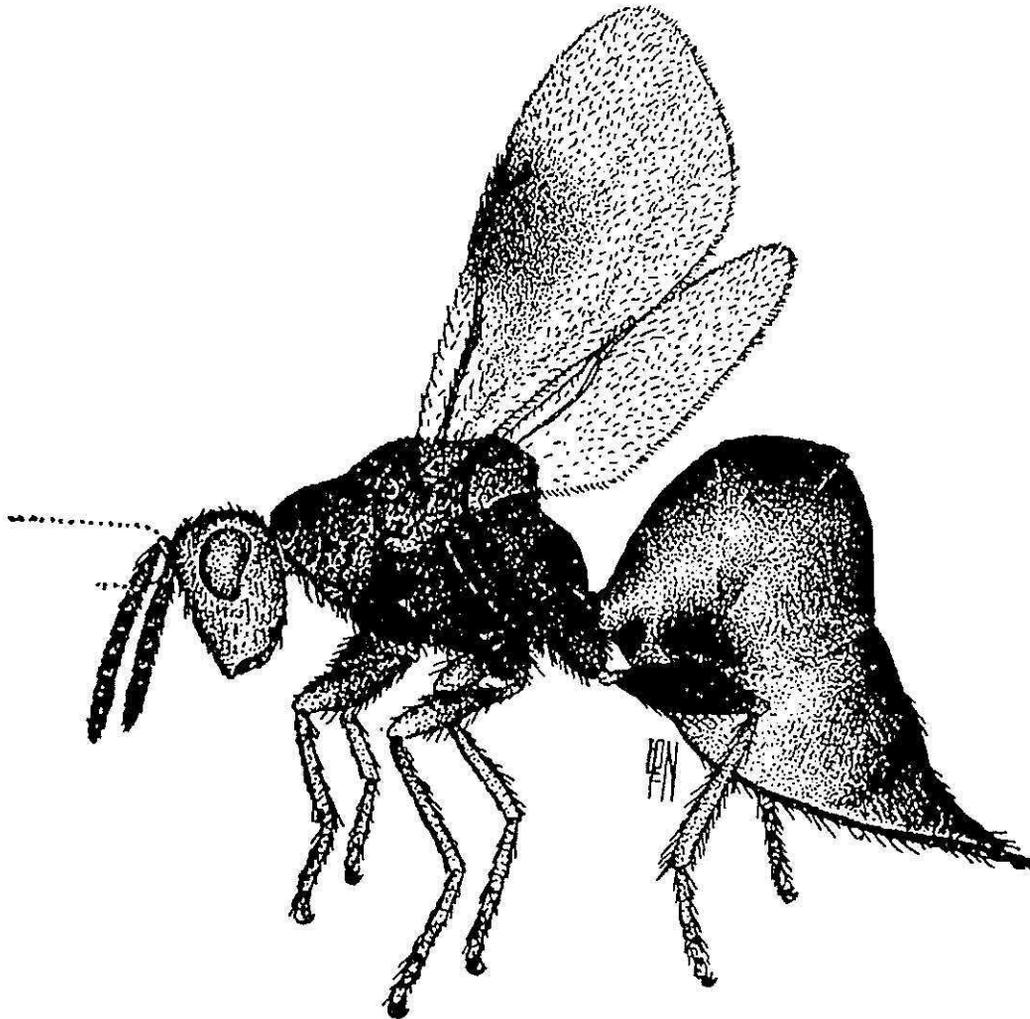


FIG. 1.—*Bephratelloides cubensis* Ashmead (female), the annona seed chalcid. (Drawn by L. Pierre-Noel).

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FIG. 2.—Damage by the annona seed chalcid to seed of developing fruit. Note adult exit holes and one adult female on top between two seeds.

(2 to 5 pounds) and has a juicy, slightly sour, creamy white, edible pulp with many shining black or brown oblong 1.2 to 1.5 cm long seeds. Guanábana commonly flowers from June to October; the fruit ripens mainly in the fall.²

The economic importance of guanábana lies in its edible pulp, which is eaten fresh or used in making drinks (nectar), ice cream, sherbets and preserves. Immature fruits can be cooked as a vegetable, and the leaves, flowers and seeds are used in medicine. A louse insecticide can be made from the leaves. Guanábana is widely planted and naturalized in tropical regions like Mexico, the southern tip of Florida, the West Indies, Central and South America and West Africa. The region of origin probably is southeast Asia. In 1987-88 production of this fruit in Puerto Rico reached

20,500 pounds. Because of the increased interest in the production of this crop in Puerto Rico and the recent establishment of orchards in Ciales, Aibonito, and Guayama, added attention to the many pests affecting this tree is warranted. Insects damage all parts of the plant, including fruits and can greatly restrict production.

We observed the insects attacking soursop and their natural enemies in the varietal trial plots at Fortuna Agricultural Experiment Station (Juana Díaz, P. R.) from 1986 to 1988.

PESTS

The annona fruit chalcid, *Bephratelloides cubensis* (Ashmead) (Hymenoptera: Eurytomidae), is the main pest of soursop fruit in Puerto Rico, as first listed by Mar-

²Little, J. R., L. Elbert and F. Wadsworth, 1964. Common trees of Puerto Rico and the Virgin Islands. USDA Forest Service Agricultural Handbook. 249: 1-548.

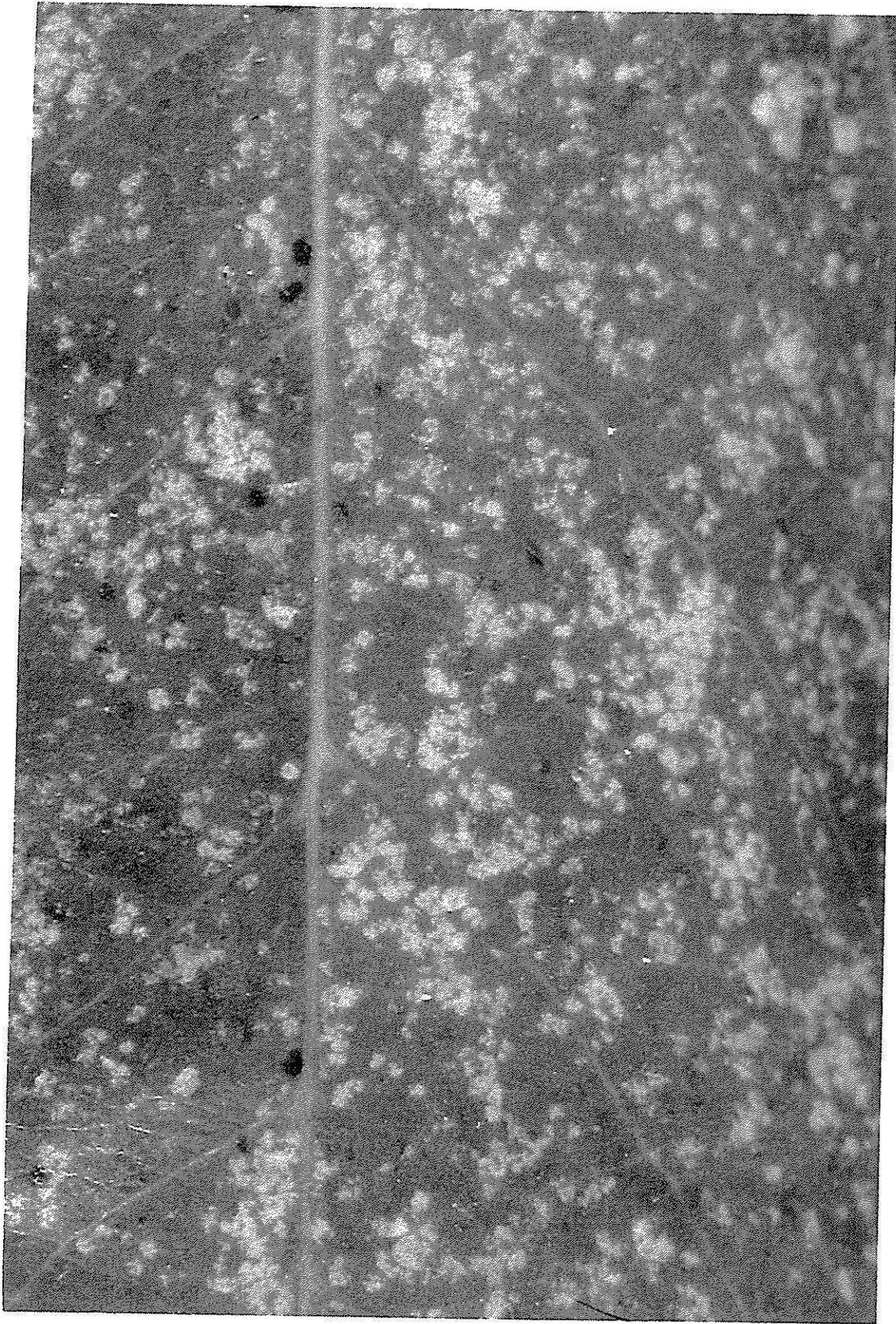


FIG. 3.—Damage to soursop leaves caused by the cotton lace bug, *Corythucha gossypii* (F.).

torell.^{3,4} Female wasps (fig. 1) oviposit into the young seed of developing fruit. Usually developing singly within the seeds, larvae destroy a large percentage (fig. 1) while the fruit is still on the tree.^{3,4,5,6} After completing development, the young wasps emerge from the seed, tunnel through the pulp and emerge through the fruit skin. Exit holes are readily visible on affected fruits (fig. 2). Some attacked fruits fail to develop; instead, they darken and mummify, and usually abort.

The cotton lace bug, *Corythucha gossypii* F. (Hemiptera: Tingidae), is generally the main pest of mature foliage. It has been previously recorded by Martorell and Wolcott.^{3,4,5} Feeding by adults or nymphs produces typical spotting, discoloration and chlorosis (fig. 3). Massive infestations cause premature defoliation. This insect, more prevalent during the dry months (February to April) diminish with the onset of the rainy season (May). No parasites or predators of this pest were observed.

Other commonly encountered pests are as follows: the spirea aphid, *Aphis citricola* Patch (Homoptera: Aphididae) attacking young leaves causes deformation or leaf curling. This insect has previously been collected at Isabela, Río Piedras and along the Cayey-Salinas road.^{4,7} The black citrus aphid, *Toxoptera aurantii* (Fonscolombe) (Homoptera: Aphididae) attacks both foliage and flowers. It has been reported by Smith⁷ and Martorell.⁴

The hemispherical scale, *Saissetia coffeae* (Walker) (Homoptera: Coccidae) (fig. 4) is very common on guanábana, and occurs wherever the tree grows. It is frequently tended by the fire ant, *Solenopsis geminata* (F.). Wolcott^{5,6} listed this pest as *S. hemisphaerica* (Targioni). All developmental stages of this scale feed on fruits, foliage and stems. The scales abound on leaf veins and edges. Attacked trees show sooty mold. The soft scale, *Philephedra tuberculosa* Nakahara & Gill (fig. 5), not previously reported for Puerto Rico, abounds on fruits, leaves and stems of soursop. This scale is now widespread in Puerto Rico and has been found attacking numerous species of trees, shrubs and annuals (authors' notes). The pustule scale, *Asterolecanium pustulans* (Cockerell) (Homoptera: Asterolecaniidae), is considered one of the most destructive scale insects on the island. Heavy infestations are capable of killing guanábana trees.^{3,4,5,6} However, this condition was not observed by the authors in the plots at Fortuna. The first record of the pustule scale for Puerto Rico was presented by Busck,⁸ who collected it in San Juan.

Other insects have been reported on guanábana in Puerto Rico (table 1). These include several scale insects, a tree termite, a mirid bug and three Lepidoptera species.^{3,4,5,6,8,9}

NATURAL ENEMIES

We collected and reared natural enemies

³Martorell, L. F., 1945. A survey of the forest insects of Puerto Rico. Part 1. *J. Agric. Univ. P. R.* 29: 1-354.

⁴Martorell, L. F., 1976. Annotated food plant catalog of the insects of Puerto Rico. Univ. P. R. Agric. Exp. Stn.

⁵Wolcott, G. N., 1936. Insectae Borinquensis—A revised annotated check-list of the insects of Puerto Rico. *J. Agric. Univ. P. R.* 20: 1-680.

⁶Wolcott, G. N., 1948. The insects of Puerto Rico. *J. Agric. Univ. P. R.* 32: 1-975.

⁷Smith, C. F., L. F. Martorell and M. E. Pérez-Escolar, 1963. Aphididae of Puerto Rico. *J. Agric. Univ. P. R.* 37: 1-121.

⁸Busck, A., 1900. Notes on a brief trip to Puerto Rico in January and February 1899 including a: List of Coccidae collected by Mr. A. Busck in Puerto Rico; J. Pergande and T. D. A. Cockerell, USDA. Div. Entomol. Bull. 22: 88-93.

⁹Maldonado-C., J., 1969. The miridae of Puerto Rico. Univ. P. R. Agric. Exp. Stn. Tech. Paper. 37: 1-121.

TABLE 1.—*Important insects of soursop (guanábana) Annona muricata L. Puerto Rico*

Order-Family	Species
Hymenoptera	
Eurytomidae	<i>Bephratelloides cubensis</i> Ashmead
Hemiptera	
Tingidae	<i>Corythuca gossypi</i> (F.)
Miridae	<i>Hyaloides nani</i> Maldonado
Homoptera	
Aphididae	<i>Aphis citricola</i> Patch
	<i>Toxoptera aurantii</i> (Fonscolombe)
Coccidae	<i>Saissetia coffeae</i> (Walker)
	<i>Saissetia oleae</i> (Olivier)
	<i>Philephedra tuberculosa</i> Nakah.-Gill ¹
Asterolecaniidae	<i>Asterolecanium pustulans</i> (Cockerell)
Diaspididae	<i>Aonidiella aurantii</i> Maskell
	<i>Aonidiella comperei</i> McKenzie
	<i>Chrysomphalus adonidium</i> L.
	<i>Mycetaspis personata</i> Comstock
	<i>Pinnaaspis strachani</i> (Couley)
	<i>Selenaspis articulatus</i> (Morgan)
Pseudococcidae	<i>Nipaecoccus nipae</i> (Maskell)
	<i>Planococcus citri</i> (Risso)
	<i>Pseudococcus longispinus</i> (T. & T.)
Isoptera	
Termitidae	<i>Nasutitermes costalis</i> (Holmgren)
Lepidoptera	
Pyralidae	<i>Elasmopalpus lignosellus</i> (Zeller)
Sphingidae	<i>Cocytius antaeus antaeus</i> (Drury)
	<i>Protambulix strigilis</i> Clark

¹ New record for Puerto Rico.

of insect pests attacking guanábana at Fortuna. Natural enemies and their hosts were identified by E. E. Grissell (Hymenoptera: Pteromalidae) and A. L. Norrbon (Diptera: Chamaemyiidae) from the Systematic Entomology Laboratory, BBII. USDA, Beltsville, Maryland; K. M. Harris and A. Polaszek, Commonwealth Institute of Entomology, London and A. Hamon, Dep. of Agriculture and Consumer Service, Gainesville, Florida.

Leucopis (Leucopis) sp. (Diptera: Chamaemyiidae). Larvae of this family are known predators of aphids, mealybugs and

soft scale. Specimens were reared in the laboratory from pupae attached to guanábana trees at Fortuna, which were infested with mealybugs, aphids and scales. Later specimens of *Leucopis bella* (Loew) were reared from ovisacs of the mealybug *Planococcus citri* (Risso) and *Philephedra tuberculosa*. This is the first record of *Leucopis bella* (Loew) from these hosts in guanábana in Puerto Rico.

Scutellista cyanea Motschulsky (Hymenoptera: Pteromalidae), a parasitic wasp was reared from *S. coffeae* on soursop leaves at Fortuna. The aphelinid paradioid

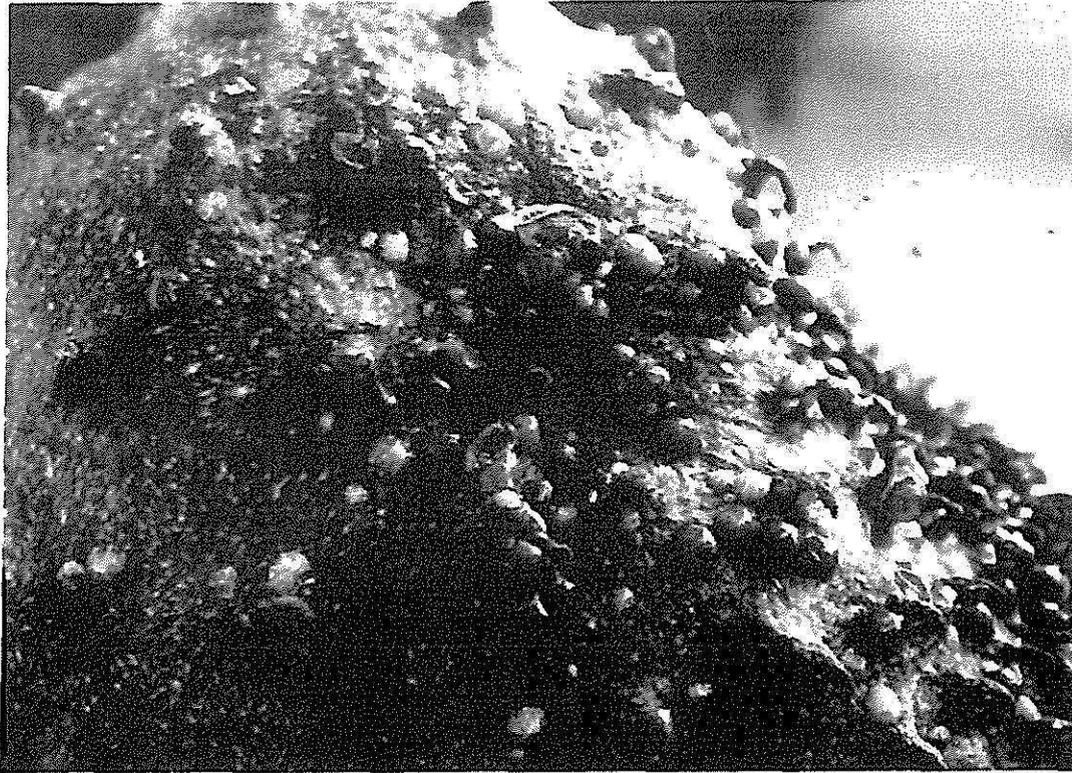


FIG. 4.—Adults of the hemispherical scale, *Saissetia coffeae* (Walker) on soursop fruit.

Coccophagus pulvinariae Compere was reared from *P. tuberculosa*. Another aphelinid, *Coccophagus rusti* Compere, was reared from *S. oleae* on fruits. These are new hosts as well as new Puerto Rican records.

Adults and larvae of the ladybeetle *Colophora inaequalis* (F.) (Coleoptera: Coccinellidae) prey on *A. citricola*. The syrphid fly, *Baccha clavata* (F.) (Diptera: Syrphidae), was also reared from leaves infested with *A. citricola*; also *Chrysopa* sp. (Neuroptera: Chrysopidae) was observed preying on this aphid. The cecidomyiid pre-

dator *Kalodiplosis multicifila* Felt was reared from ovisacs of the mealybug (*Planococcus citri* and *Pseudococcus longispinus* (Targioni-Tozzetti) on the fruits.

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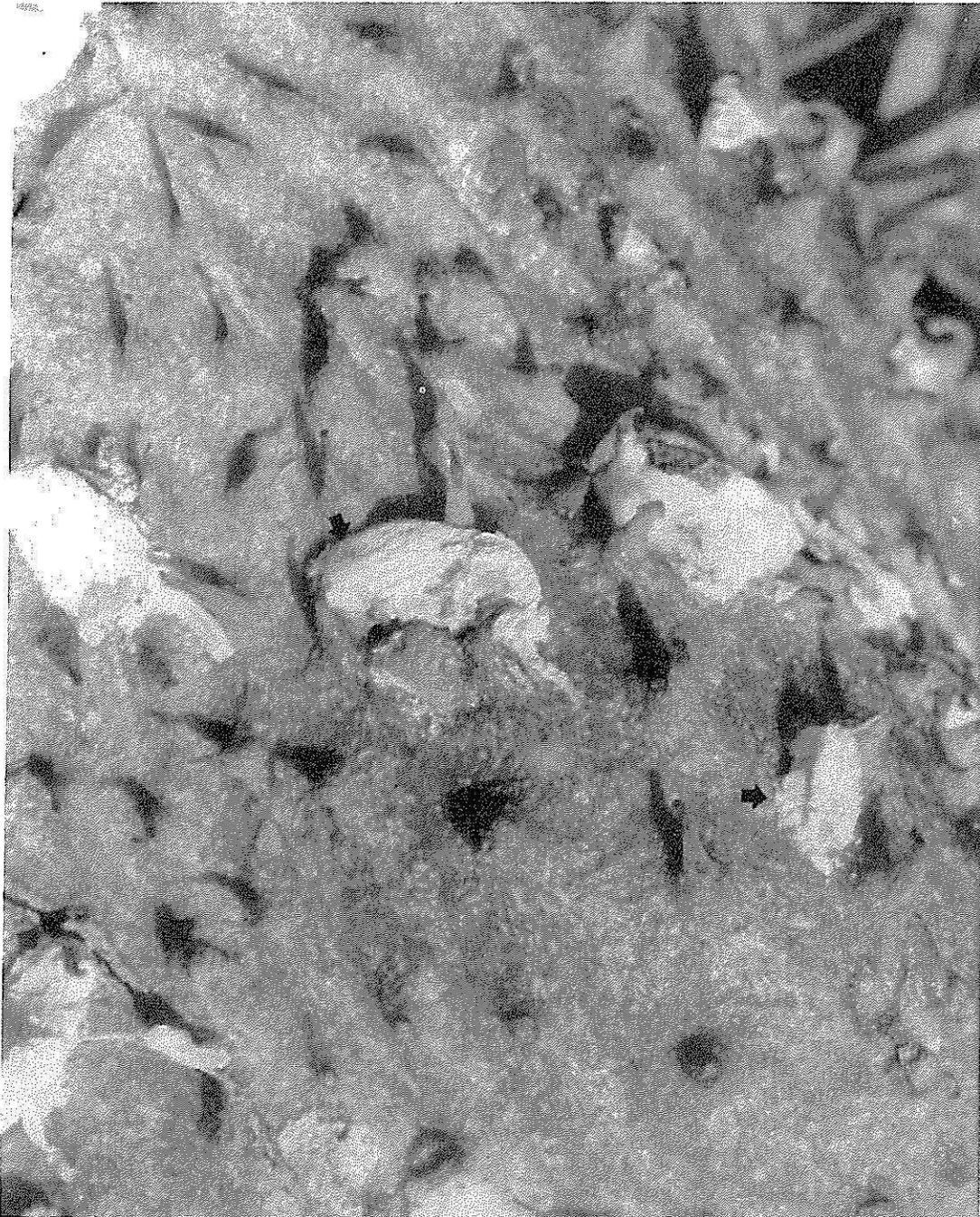


FIG. 5.—The Soft scale, *Philaphedra tuberculosa* Nakahara & Gill on soursop fruit.