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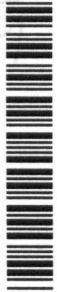
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Journal Title: JOURNAL OF AGRICULTURE
OF THE UNIVERSITY OF PUERTO RICO

Call #: S181 .A155 SCI PER

Volume: 71

Location:

Issue: 1

Item #:

Month/Year: 1987

Pages: 129-132

Article Author: GAUD SM, COVAS FG,
ABREU E, INGLES R

Article Title: THE INSECTS OF NISPERO
[MANILKARA-ZAPOTA (L) VANROGEN,P.] IN
PUERTO-RICO

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with *P. variotti* COD reduc-
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Guillermo Cacho Silvestrini
Assistant Chemical Engineer
Pilot Plant

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Research Note

THE INSECTS OF NÍSPERO [MANILKARA ZAPOTA (L.) P. VAN ROGEN] IN PUERTO RICO¹

Nispero (sapodilla plum) is a tree native to southern Mexico and Central America. The white latex of this tree is the main source of commercial chicle used in the production of chewing gum. This tree has been introduced in Puerto Rico where it is planted for its delicious fruit and also as an ornamental and shade tree. Fruits can be made into preserves and syrup. The tree grows to 50 feet under cultivation and can grow to 100 feet in its natural habitat.

Several years ago the Agricultural Experiment Station at Fortuna in Juana Diaz introduced new varieties with good fruit qualities and yields. Many of these varieties have larger fruits with better taste than the previous varieties grown in Puerto Rico. Grafted trees start producing excellent fruit at an early stage.

The economic importance of the nispero lies in its edible fruit, which if left to ripen on the tree, will be damaged by different species of insects. Of the insects reported and found by the authors, fruitflies, wasps and a curculionid beetle cause most of the damage to fruits. Scale insects damage the branches and leaves, and the May or June beetles attack the leaves and roots.

The adult of the Caribbean fruitfly, *Anastrepha suspensa* (L.) (Diptera: Tephritidae), damages fruit by ovipositing inside it when the nispero starts ripening. Development of larvae and their emergence to pupate in the soil renders fruit commercially valueless. The authors have reared up to

ten flies from a single fruit. This fly has been previously recorded from Puerto Rico by Wolcott^{2,3} and Martorell⁴.

The common wasp, *Polistes crinitus* (Felton) (fig. 1) (Hymenoptera: Vespidae), causes heavy damage by feeding on the fruits as soon as they start ripening (fig. 2, 3). This damage, observed in fruits at the Fortuna and Isabela research and development centers, has not been previously reported in Puerto Rico. To avoid wasp dam-



FIG. 1.—The wasp, *Polistes crinitus* (Felton), feeding on nispero fruit.

¹ Manuscript submitted to Editorial Board September 9, 1986.

² Wolcott, G. N., 1936. Insectae Borinquenses: a revised annotated checklist of the insects of Puerto Rico with a host plant index by José I. Otero, J. Agric. Univ. P. R. 20 (1): 1-60.

³ —, 1948. The insects of Puerto Rico, J. Agric. Univ. P. R. 32 (1-4): 1-927.

⁴ Martorell, Luis F., 1972. Annotated food plant catalog of the insects of Puerto Rico, Univ. P. R., Agric. Exp. Stn., Dep. Entomol., pp. 303.



FIG. 2.—Fruit destroyed by *P. crinitus*.

age, fruits should be picked as soon as they are green ripe.

The third most injurious insect to nispero is a curculionid beetle, *Conotrachelus* sp., a new record in this fruit for Puerto Rico. This insect has been reared from fruits in the Fortuna Research and Development Center. The weevil lays its eggs inside young fruits, and the larvae destroy the pulp, making the fruits inedible (fig. 4). Infested fruits can be identified by the white gummy exudations present in every area of the rind where females have oviposited (fig. 5).

Other insects observed by the authors that attack this tree are *Diaprepes abbreviatus* L. (Coleoptera: Curculionidae) and *Phyllophaga* spp. (Coleoptera: Scarabaeidae). Adults of *Phyllophaga citri*, *P. vandinei*, *Clemora apicalis*, and *D. abbreviatus* were observed damaging the foliage. Adults of May or June bugs did heavy defoliation (fig. 6). Feeding was lim-

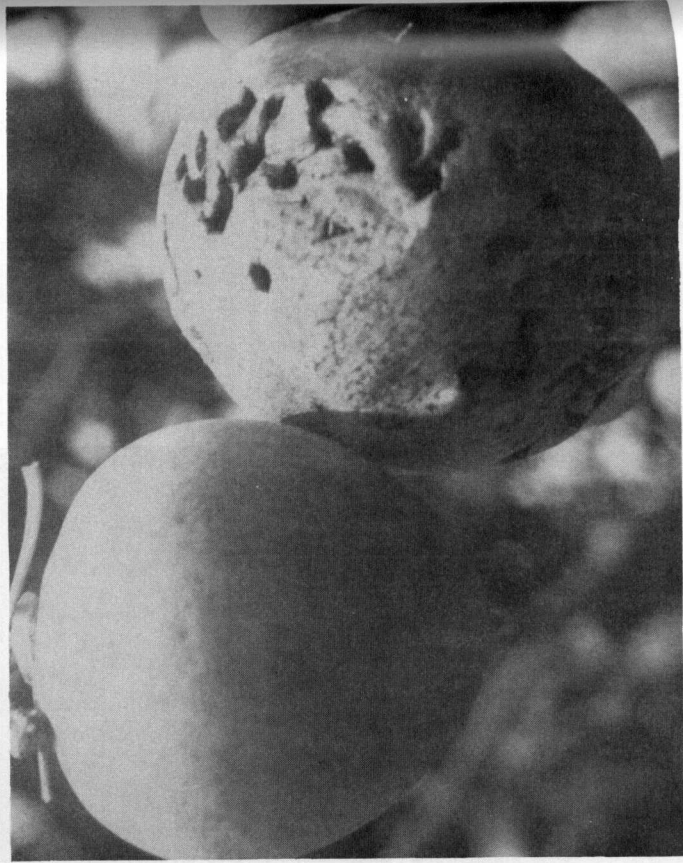


FIG. 3.—Partly and recently attacked fruit showing damage caused by wasps.

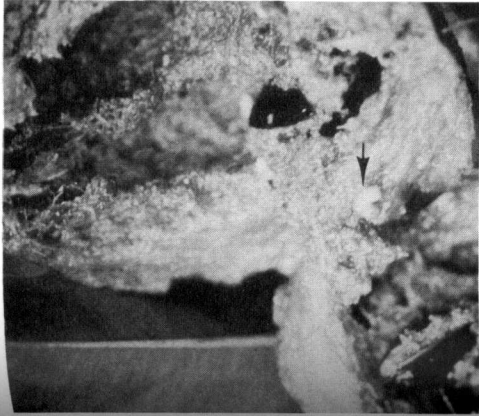


FIG. 4.—Damage to fruits caused by larvae of *Conotrachelus* sp.



FIG. 6.—Damage caused by *Phyllophaga* feeding on foliage.

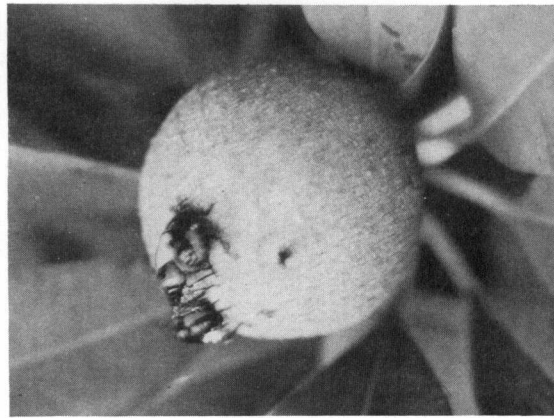


FIG. 7.—Pentatomid nymphs feeding on fruit.

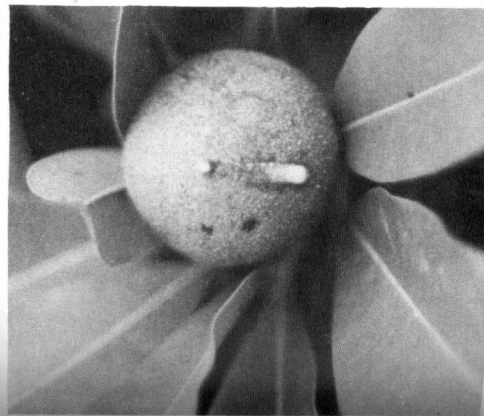


FIG. 5.—Gummy exudation caused by oviposition of *Conotrachelus* sp.

ited to mature leaves, not to young or old leaves, and caused the death of many trees.

Of 17 different níspero varieties planted at the Isabela Research and Development Center and replicated five times each, for a total of 85 trees, only 28 survived the attack of *Phyllophaga*. Close examination of roots and the use of traps confirmed that the main causes of the death of these trees were white grubs and the adults of *Phyllophaga*. Traps showed an average of 920 adults of *Phyllophaga* per tree; *P. vandinei* was the most abundant species in a proportion of 9:1. *Phyllophaga vandinei* may be one of the most important limiting factors from growing níspero in northern Puerto Rico.

The following scale insects (Homoptera: Coccoidea) have been previously recorded by Wolcott⁵ and Martorell⁶ as damaging níspero trees: *Asterolecanium pustulans* (Asterolecaniidae), killing trees on Vieques Island; *Pulvinaria psidii* and *Vinsonia stellifera* (Coccidae); *Howardia biclavis* (Diaspididae) and *Nipaecoccus nipae* (Pseudococcidae).

The senior author collected specimens of the following scale insects from heavily infested níspero twigs and leaves in the Fortuna research and development center: *Pulvinaria psidii*, *Vinsonia stellifera*, *Hemiberlesia lataniae*, and *Ischnaspis longirostris* (Diaspididae) and *Asterolecanium pustulans*. Another insect observed feeding on fruits (fig. 7) at Isabela was an unidentified pentatomid (Hemiptera).

On damaged fruits the authors found the following sap beetles (Nitidulidae): *Haptoncus luteolus*, *Carpophilus hemipterus*, *C. humeralis*, *C. freemani*, *C. mutilatus*, and *Lobiopa insularis*.

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TRATAMIENTO PARA PONEDORAS MANTENIDAS

En el Centro de Investigación y Desarrollo de Lajas (CIDL) se hizo un estudio con gallinas ponedoras de la línea HyLine (cascarón blanco) en jaulas individuales y comunales con el objetivo de averiguar el efecto de tratarlas con parásitos internos y externos. Todas las gallinas recibieron una dieta comercial que contenía 17.5% de proteína bruta, 10% de calcio, 0.6% de fósforo y 2772 Kcal. Las gallinas en jaulas que recibieron alimento a libre albedrío y las en jaulas elevadas recibieron 113.5 g./gallina y día. Los parásitos internos y externos se identificaron y cuantificaron siguiendo los métodos de Mönnig según los de Soulsby³.

Las pollonas de ambas líneas fueron seleccionadas por productores comerciales a las 4-6 semanas de edad. Aunque ambas líneas dieron negativo a parásitos intestinales, como medida preventiva se trató cada pollona con 0.43 centímetros cúbicos (cc.) de una solución de piperazina al 34% al día y 3 semanas después.

Las pollonas de la línea HyLine estaban infectadas con el ácaro de la pluma (*Sarothamni*) al llegar al CIDL.

En la primera evaluación se siguió un diseño de bloques al azar con nueve repeticiones de tres gallinas cada una en cada tratamiento. Cincuenta y cuatro gallinas de cada línea se ubicaron en 108 jaulas individuales de alambre de 16 x 8 pulgadas.

¹Manuscript submitted to Editoria

²El mencionar nombres comerciales de investigadores ni la Estación Experimental de productos comerciales de igual o superior calidad.

³Soulsby, E. J. L., 1969. Helminths of Poultry, Williams and Wilkins Co., Baltimore, Md.