

## NOTES ON THE INSECT FAUNA ON TWO SPECIES OF *ASTROCARYUM* (PALMAE, COCOEAE, BACTRIDINAE) IN PERUVIAN AMAZONIA, WITH EMPHASIS ON POTENTIAL PESTS OF CULTIVATED PALMS

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### Abstract

Insects were inventoried on two palm species, *Astrocaryum chonta* and *Astrocaryum carnosum*, respectively located in the lower Ucayali River valley near Jenaro Herrera, and in the upper Huallaga River valley near Uchiza.

This fauna, which is highly diversified, includes many pests of cultivated palms, many other phytophagous species, the host plants of which were unknown, and many predators.

*Astrocaryum chonta* and *Astrocaryum carnosum* are considered sources of pests for industrial palm plantations in Peruvian Amazonia.

**Key words:** *Insects, Astrocaryum, pests, cultivated palms, Amazonia, Peru.*

### NOTAS SOBRE LA FAUNA DE INSECTOS DE DOS ESPECIES DE *ASTROCARYUM* (PALMAE, COCOEAE, BACTRIDINAE) EN LA AMAZONIA PERUANA, CON ÉNFASIS EN LAS PLAGAS POTENCIALES DE LAS PALMERAS CULTIVADAS

### Resumen

La fauna de insectos de las palmas *Astrocaryum chonta* y *Astrocaryum carnosum* se ha estudiado en dos lugares diferentes de la Amazonia peruana: en la región de Jenaro Herrera, bajo Ucayali para la primera especie, y en la región de Uchiza, alto Huallaga para la segunda.

Esta fauna es extremadamente diversificada. Incluye numerosas especies de insectos conocidos como depredadores de las palmas cultivadas, así como otras especies de fitófagos cuyas plantas hospedantes aún no eran conocidas. Numerosas especies de otros insectos, depredadores o de un nivel trófico mal definido, forman parte también de la biocenosis de las palmas estudiadas. *Astrocaryum chonta* y *Astrocaryum carnosum* son considerados como focos de infestación de depredadores para las plantaciones industriales de palmas en la Amazonia peruana.

**Palabras claves:** *Insectos, Astrocaryum, plagas, palmeras cultivadas, Amazonia, Perú.*

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NOTES SUR LA FAUNE ENTOMOLOGIQUE DE DEUX ESPÈCES D'ASTROCARYUM (PALMAE, COCOEAE, BACTRIDINAE) DE L'AMAZONIE PÉRUVIENNE, ET MISE EN ÉVIDENCE DE RAVAGEURS POTENTIELS DES PALMIERS CULTIVÉS

Résumé

La faune entomologique des palmiers *Astrocaryum chonta* et *Astrocaryum carnosum* a été étudiée dans deux sites différents de l'Amazonie péruvienne : région de Jenaro Herrera sur le bas Ucayali pour la première espèce, et région d'Uchiza sur le haut Huallaga pour la seconde.

Cette faune est extrêmement diversifiée. Elle comprend de nombreuses espèces d'insectes connues comme ravageurs des palmiers cultivés, ainsi que d'autres espèces de phytophages dont les plantes hôtes n'étaient pas encore connues. De nombreuses autres espèces d'insectes, prédateurs ou de niveau trophique mal défini, font aussi partie de la biocénose des palmiers étudiés.

*Astrocaryum chonta* et *Astrocaryum carnosum* sont considérés comme foyers d'infestation en ravageurs pour les plantations industrielles de palmiers en Amazonie péruvienne.

**Mots clés :** Insectes, *Astrocaryum*, ravageurs, palmiers cultivés, Amazonie, Pérou.

INTRODUCTION

The study of insect fauna living on native palms in the forests of Peruvian Amazonia began in 1986. The initial aim was to discover the host plants of bugs belonging to the genus *Lincus* (Pentatomidae). These bugs are known to be vectors of the *Phytomonas* diseases known as Marchitez sorpresiva and hartrot, respectively of *Elaeis guineensis* Jacquin, the African oil palm, and *Cocos nucifera* L., the coconut palm (Desmier de Chenon *et al.*, 1983; Dolling, 1984; Perthuis *et al.*, 1985; Louise *et al.*, 1985). Our hypothesis was that these bugs were likely to live on native palms, probably on species which are similar to *Elaeis guineensis*, and occur frequently in dense populations in the Amazon basin. We considered first some genera in Cocoeae (Arecoideae), to which *Elaeis* belongs. These included *Astrocaryum*, *Orbignya*, *Scheelea*, and the American oil palm, *Elaeis oleifera* (Humboldt, Bonpland, Kunth) Cortes. But we also looked for bugs in other groups of Arecoideae, such as Areceae (Euterpeinae: *Euterpe*, *Jessenia*, *Oenocarpus*) and Iriarteae (*Dictyocaryum*, *Iriartea*, *Socratea*, *Wettinia*), and in other subfamilies, Calamoideae (*Mauritia*), Coryphoideae (*Chelyocarpus*), Phytelphantoideae (*Phytelphas*).

Bugs of the genus *Lincus* were finally found on *Astrocaryum* (Couturier & Kahn, 1989). This result led us to survey the insect fauna on these palms, with the view of estimating the importance of *Astrocaryum* species as hosts of potential pests for industrial palm plantations in Amazonia.

STUDY SITES AND METHODS

Insect fauna on palms was surveyed in two regions of Peruvian Amazonia. 1) In the upper Huallaga valley, department San Martín, province Mariscal Cáceres, at about 20 km of Uchiza (8°17'S, 76°26'W), near an industrial plantation of African oil palm (Palmas del Espino, S.A.). Average annual rainfall is 3000 mm with a peak from December to March, and a dry period from June to August. Average annual temperature is 26°C. Dense populations of *Astrocaryum carnosum* Kahn & Millán

extend on alluvial soils which are periodically flooded by the Huallaga River, usually in February and March. This multistemmed palm dominates the understory with two other palm species, *Phytelephas macrocarpa* Ruiz & Pavón and *Chelyocarpus ulei* Dammer. Up to 582 individuals or axes have been counted on 0.4 ha including seedlings, juveniles and adults (Kahn & Mejía, 1990). 2) In the lower Ucayali River basin, department Loreto, province Requena, at 200 km southwest of Iquitos, near Jenaro Herrera (4°55'S, 73°45'W). Average annual rainfall is 2900 mm; rainy and dry seasons extend from December to April and May to November, respectively. Average annual temperature is 25.9°C. *Astrocaryum chonta* Martius, a single-stemmed species, forms dense populations on alluvial soils which are annually flooded by the river. Up to 1050 individuals have been counted on 0.4 ha including seedlings, juveniles and adults (Kahn & Mejía, 1990).

Insect fauna has been regularly surveyed on these two species from 1987 to 1990 during dry and rainy seasons. Insects have been caught by palm dissecting. The trunk is cut down and the crown falls on a previously cleaned place by eliminating litter in order to make easier the location of escaping insects; most of those species living in the crown do not escape by flying at palm fall, but leave walking from the fallen palm and attempt to hide in the litter. Then the palm leaves are cut at their base and examined from the elder to the younger, and insects are collected. Larvae are reared to obtain adults. All collections are deposited at Antenne ORSTOM in the National Museum of Natural History, Paris.

## RESULTS

Four orders and 16 families of insects (ants, termites, and pollinators excluded) have been collected on *Astrocaryum chonta* and *Astrocaryum carnosum* (Table 1): Heteroptera (Pentatomidae), Homoptera (Cercopidae, Coccidae, Pseudococcidae, Phoenicococcidae, Margarodidae), Coleoptera (Bruchidae, Curculionidae, Chrysomelidae, Dynastidae, Elateridae, Scolytidae), Lepidoptera (Brassolidae, Castniidae, Limacodidae, Noctuidae).

### Pests of cultivated palms on native *Astrocaryum*

Heteroptera - In 1978, the bugs of the genus *Lincus* were not known as probable vectors of *Elaeis guineensis* disease and were not listed as pests by Genty *et al.* (Table 1). *Lincus* distribution is mainly concentrated in Amazonia, except for two central American species. Most of them are known only from the type, often with geographic data lacking in precision (Rolston, 1983). Of the 35 species of *Lincus*, 16 are from Peru (Fig. 1). These include two new species collected on the palm studied (Couturier & Kahn, 1989; Rolston, 1989): *Lincus malevolus* (Fig. 2) on *Astrocaryum chonta* in the lower Ucayali River valley, *Lincus spurcus* on *Astrocaryum carnosum* in the upper Huallaga River valley.

Coleoptera - *Rhynchophorus palmarum* (Curculionidae) was frequent on both *Astrocaryum* species. Three of the six species of Chrysomelidae reported as cultivated palm pests by Genty *et al.* (1978) were found on both species. These included

Insects		1	2	3
Heteroptera:				
Pentatomidae	<i>Callostethus guttatopunctatus</i> F.		+	
	<i>Lincus malevolus</i> Rolston	+		
	<i>Lincus spurcus</i> Rolston		+	
	<i>Parochlerus latus</i> Breddin		+	
Homoptera:				
Cercopidae	not identified	+		
Coccidae	<i>Toumeyella</i> sp.	+	0	
Margarodidae	not identified	+	0	
Phoenicococcidae	<i>Limacoccus kosztarabi</i> Foldi	+	0	
	<i>Limacoccus venezuelana</i> Foldi	+	0	
Pseudococcidae	<i>Palmicultor</i> sp.	+	0	
Coleoptera:				
Bruchidae	<i>Caryoborus serripes</i> Sturm	+	0	
Chrysomelidae	<i>Alurnus humeralis</i> Rosemberg	+		+
	<i>Cephaloleia</i> aff. <i>vagelineata</i> Pic	+		+
	<i>Delocrania cossyphoides</i> Guérin	+	+	+
	<i>Demotispia</i> aff. <i>pallida</i> Baly	+	+	+
	<i>Hispoleptis subfasciata</i> Pic		+	+
	<i>Spaethiella tristis</i> Bohman	+	+	+
Curculionidae	<i>Homalinotus nodipennis</i> Chevrolat	+		
	<i>Homalinotus praelongus</i> Vaurie	+		
	<i>Metamasius hemipterus</i> L.	+	+	
	<i>Rhinostomus barbirostris</i> F.	+	+	
	<i>Rhynchophorus palmarum</i> L.	+	+	+
Dynastidae	<i>Harposcelis paradoxus</i> Burmeister	+	+	
	several species not identified	+	+	
Elateridae	<i>Achrestus suturalis</i> Schw.	+	+	
	<i>Platycrepidius</i> sp.	+	+	
Scolytidae	<i>Coccotrypes dactyliperda</i> Fabr.	+	0	
Lepidoptera:				
Brassolidae	<i>Brassolis sophorae</i> L.	+	+	+
	<i>Opsiphanes</i> sp.	+		+
Castniidae	<i>Castnia daedalus</i> Cramer	+	+	+
Limacodidae	several species not identified	+	+	+
Noctuidae	<i>Herminodes insulsa</i> Dognin	+	+	

Table I - 1: Insects found on *Astrocarium chonta* in the lower Ucayali River valley. 2: Insects found on *Astrocarium carnosum* in the upper Huallaga River valley. 3: Insects known as pests on *Elaeis guineensis* cultivated in South America (Genty *et al.*, 1978). 0: Homoptera and Bruchidae were not collected on *Astrocarium carnosum*.

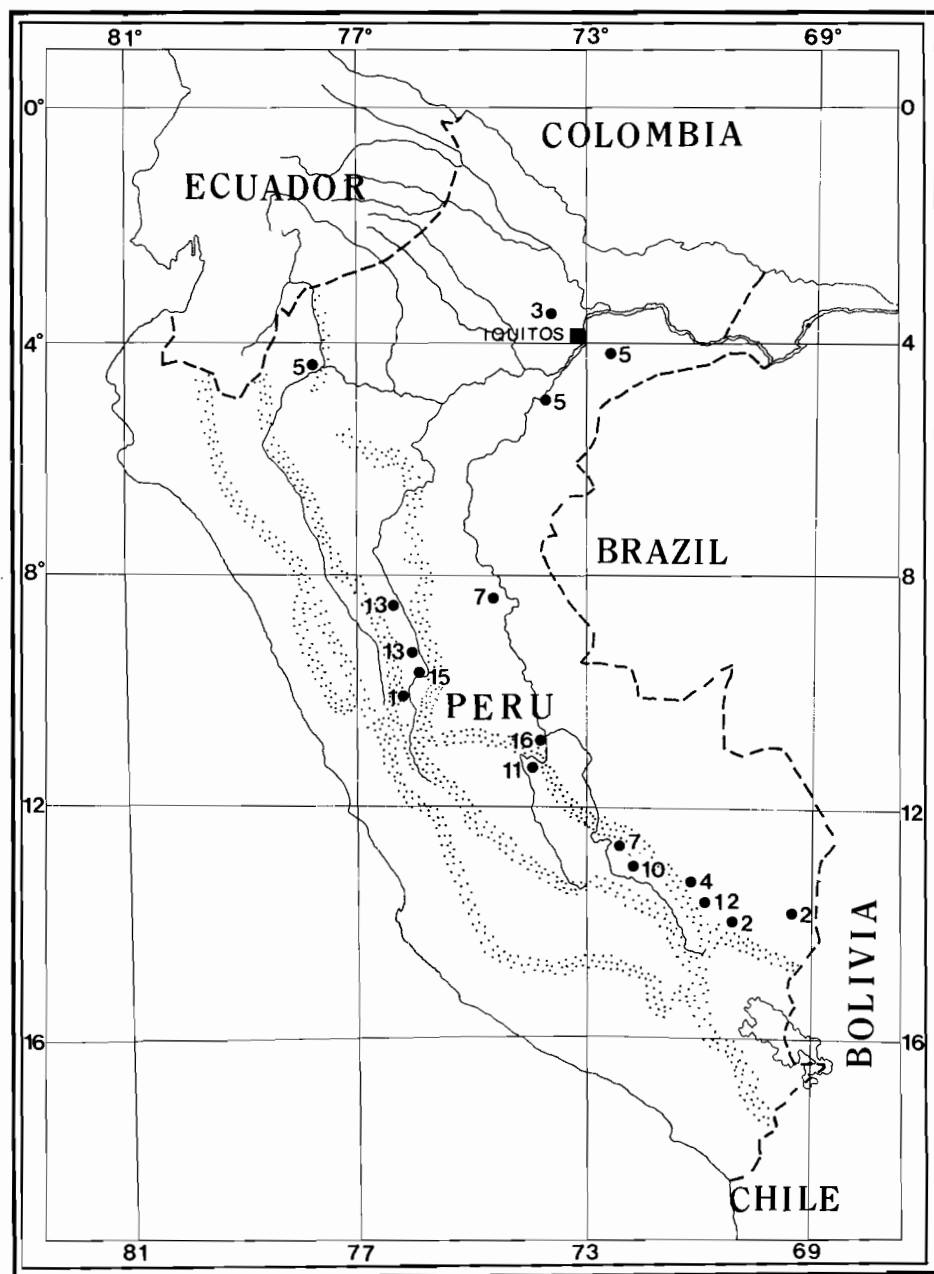


Fig. 1 - Distribution of *Lincus* (Heteroptera Pentatomidae) in Peru (Rolston, 1983; 1989). 1: *L. convexus* Rolston; 2: *L. hebes* Rolston; 3: *L. laminatus* Rolston; 4: *L. leviventris* Rolston; 5: *L. malevolus* Rolston; 6: *L. parvulus* (Ruckes); 7: *L. repizcus* Rolston; 8: *L. rufospilotus* (Westwood); 9: *L. securiger* Breddin; 10: *L. singularis* Rolston; 11: *L. sinuosus* Rolston; 12: *L. spathuliger* Breddin; 13: *L. spurcus* Rolston; 14: *L. styliger* Breddin; 15: *L. vallis* Rolston; 16: *L. varius* Rolston. Location for species 6, 8, 9 and 14 is unknown.

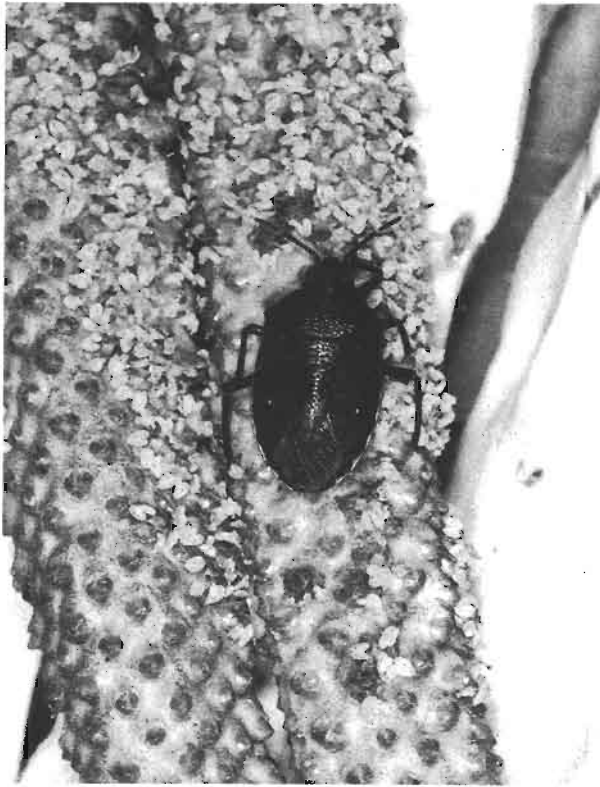


Fig. 2 - *Lincus malevolus* (Heteroptera Pentatomidae).

*Delocrania cossyphoides*, *Demotispa* aff. *pallida*, and *Spaethiella tristis*. The former was caught in high density on *Astrocaryum carnosum* (Llosa, unpubl.). The three other species, *Alurnus humeralis* (Fig. 3), *Cephaloleia* aff. *vagelineata*, and *Hispoleptis subfasciata*, were found only on *Astrocaryum chonta*.

Lepidoptera - *Herminodes insulsa* (Noctuidae) was present in low density on all individuals surveyed of both species (Fig. 4). *Castnia daedalus* (Castniidae) was found in high densities on some old trees of *Astrocaryum carnosum*.

#### Other insects associated with *Astrocaryum*

Heteroptera - *Callostethus guttatopunctatus* (Fig. 5) and *Parochlerus latus* (Pentatomidae) were collected on leaves of *Astrocaryum carnosum*. The former species develops its whole biological cycle on this palm; the host plant for the latter bug is unknown (L. H. Rolston, pers. comm., 1989).

Homoptera - Several new species of Coccoidea were collected on leaves of *Astrocaryum chonta* (D. Matile-Ferrero, in prop.): *Toumeyella* spec. nov. (Coccidae) and *Palmicultor* spec. nov. (Pseudococcidae). Two species of Phoenicococcidae, *Limacoccus*

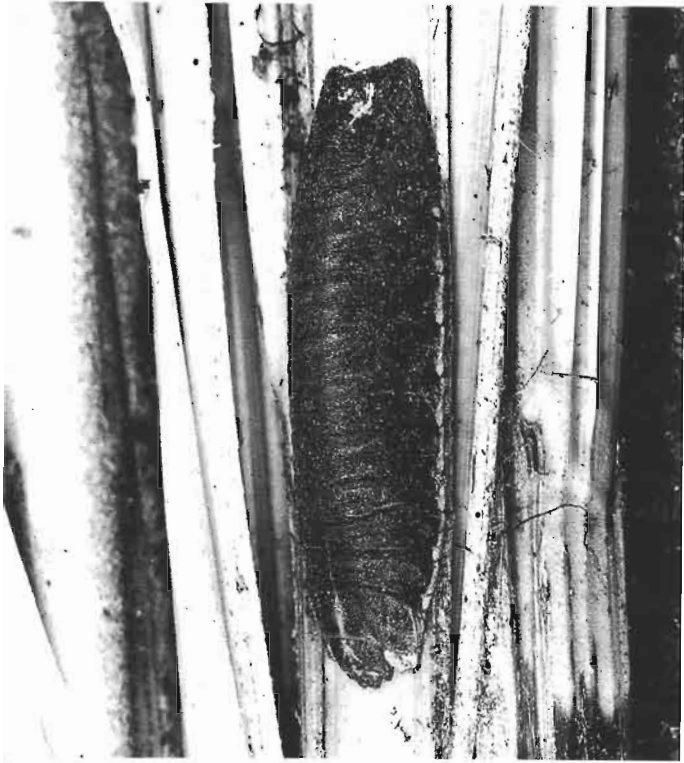


Fig. 3 - Larva of *Alurnus humeralis* (Coleoptera Chrysomelidae) in young leaves of *Astrocaryum chonta*.

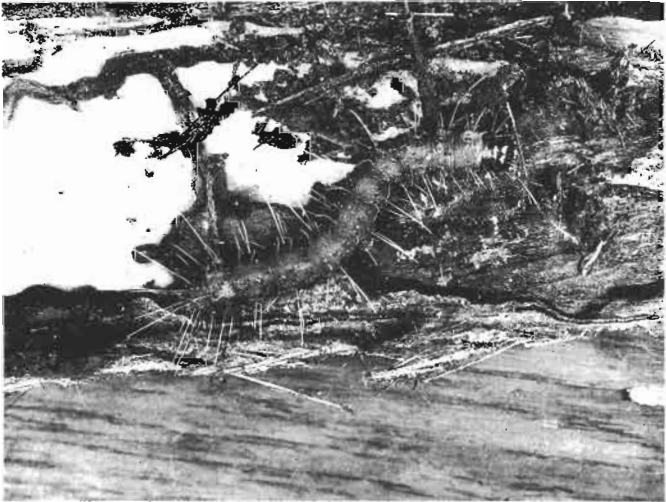


Fig. 4 - Larva of *Herminodes insulsa* (Lepidoptera Noctuidae) in leaf sheath of *Astrocaryum chonta*.

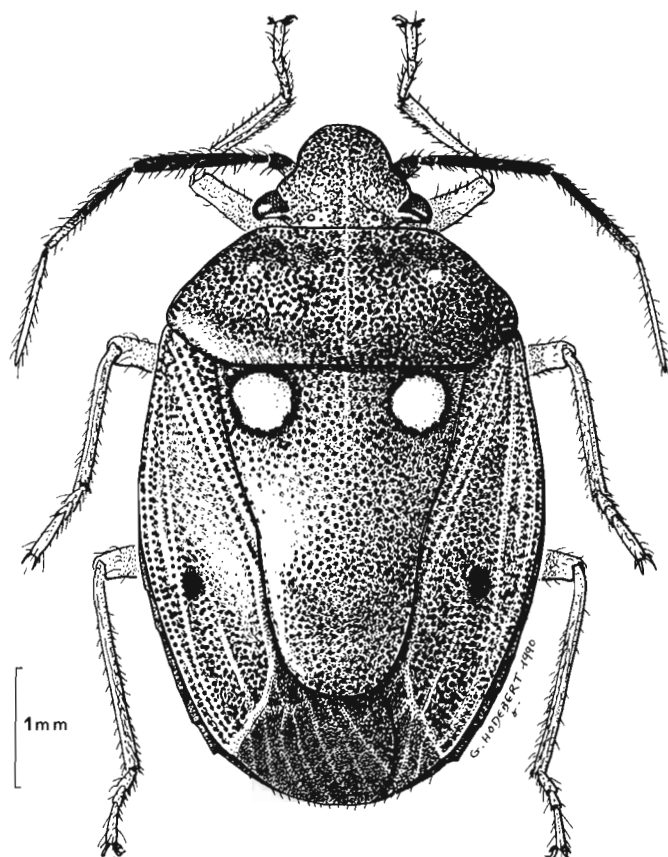


Fig. 5 - Female of *Callostethus guttatopunctatus* (Heteroptera Pentatomidae) living on *Astrocaryum carnosum*.

*venezuelana* and *Limacoccus koztarabi*, both known from Venezuela, occur on *Astrocaryum chonta*; both species live in the leaf bud, and their presence is clearly revealed by yellowish marks on leaflets. They were also found with very high frequency on *Orbignya polysticha* Burret in the terra firme forests of the lower Ucayali River valley.

Coleoptera - *Harposcelis paradoxus* (Dynastidae) develops its whole biological cycle in the litter accumulated between the leaf sheaths of *Astrocaryum carnosum*; the biology of this species was also totally unknown (R. P. Dechambre, pers. comm., 1990). Among Curculionidae, *Metamasius hemipterus* and *Rhinostomus barbirostris* were frequent on both *Astrocaryum* species, as also was *Homalinotus praelongus* on old plants of *Astrocaryum chonta*; *Homalinotus nodipennis* was found on *Astrocaryum chonta* in low frequency, however. This latter insect was also present on *Orbignya polysticha* and *Chelyocarpus repens* Kahn & Mejía (Fig. 6). Larvae of two species of Elateridae, *Achrestus suturalis* and *Platycrepidius* sp. live on the trunk of *Astrocaryum chonta* and *Astrocaryum carnosum*; according to C. Costa (pers. comm., 1990), the larvae of both



species are predators and the adults are phytophagous. Two other taxa were collected on ripe fruits of *Astrocaryum chonta*: *Caryoborus serripes* (Bruchidae), and *Coccotrypes dactyliperda* (Scolytidae), the distribution of which is very wide, including both subtemperate and tropical regions of Old and New worlds (Lepesme, 1947).

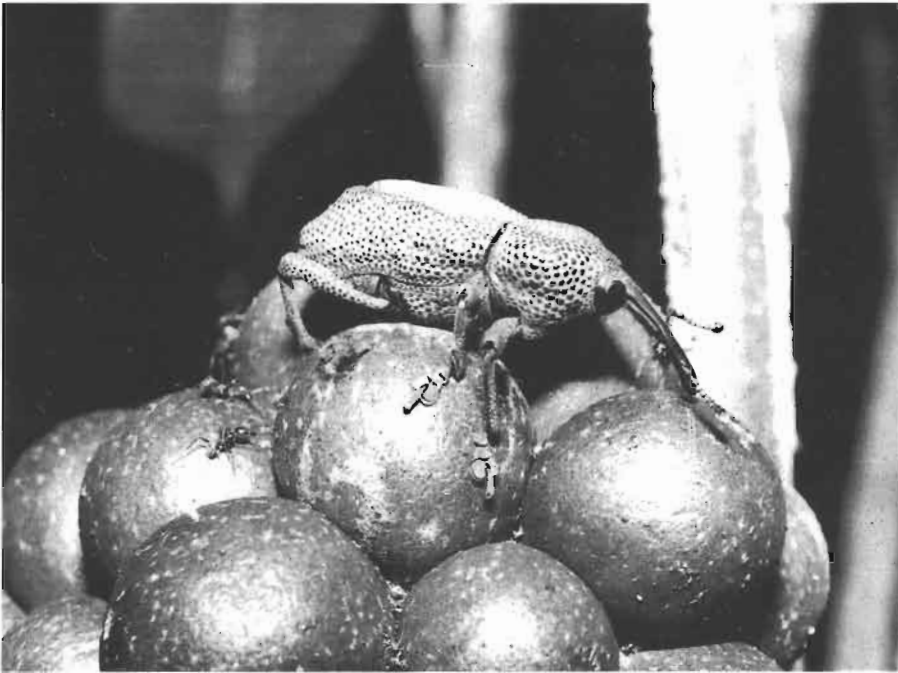


Fig. 6 - Adult of *Homalinotus nodipennis* (Coleoptera Curculionidae) photographed on the fruit of *Chelyocarpus repens*. This insect is also found on *Astrocaryum chonta*.

## CONCLUSION

The insect fauna living on *Astrocaryum chonta* and *Astrocaryum carnosum* is highly diversified. And this, even limiting the survey to the potential pests of cultivated palms. Neither pollinators, Curculionidae and Nitidulidae, bees and flies, which are legions on the inflorescences, nor ants and termites, which are so frequent on the persistent sheaths of dead leaves, have been considered.

There is no doubt, looking over table 1, that both species of *Astrocaryum* are sources of potential pests for industrial palm plantations, the more so as both palms form extended and dense populations. *Lincus malevolus* has been found on inflorescences of *Elaeis oleifera* in a seasonal swamp forest where *Astrocaryum chonta* was also in density and bearing many bugs (Llosa *et al.*, 1990); and *Lincus spurcus* living on *Astrocaryum carnosum* forms abundant populations on *Elaeis guineensis* in the neighbouring plantation.

The populations of insects on *Astrocaryum* seem to be regulated by parasitism as shown by the two following examples in Pentatomidae. *Lincus malevolus* is parasited by a Hymenoptera Encyrtidae *Hexacladia linci* (Rasplus *et al.*, 1990); and the eggs of *Callostethus guttapunctatus* are parasited by the larvae of *Trissolcus* sp. (Hymenoptera Scelionidae).

*Astrocaryum chonta* and *Astrocaryum carnosum* belong to the section *Ayri*, which includes 12 medium-sized, single or multistemmed species, all with sheaths of dead leaves persistent under the crown (Kahn & Millán, 1992). Bugs of the genus *Lincus* were collected by Kahn in 1989 on *Astrocaryum gratum* Kahn & Millán in Bolivia, Beni; *Lincus hebes* was found on the same palm species in Madre de Dios, Peru (Couturier & Kahn, 1989). *Lincus malevolus* lives on *Astrocaryum scopatum* Kahn & Millán (collected by Kahn and Borschenius in 1990) and on *Astrocaryum javarense* Trail ex Drude (Llosa *et al.*, 1990); both palm species occur in Peru, the former in the upper Marañón River valley, the latter in the Manítí River valley. An unidentified *Lincus* was recently collected on *Astrocaryum macrocalyx* Burret near Iquitos by the authors. And many pests of *Elaeis guineensis* have also been found on these *Astrocaryum*.

There are not only insects on these palms. Frequent are other arthropods, scorpions, opilions, spiders, centipeds, as well as small vertebrates, toads, snakes, and rodents. *Astrocaryum* occurs throughout the Amazon basin, in all main forest types (Kahn & Granville, 1992). It densely occupies forest understory with its gregarious species. It colonizes deforested areas and secondary forest. This genus is a good example to show that palms play a major role in forest ecosystem functioning.

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