Pest insects of the palm tree *Mauritia flexuosa* L.f., dwarf form, in Peruvian Amazonia

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Abstract — The plant. The *aguaje (Mauritia flexuosa* L.f.) is an Amazonian palm in the process of domestication to be cultivated as a dwarf form. In Peruvian Amazonia, it has a major impact on the economic, social and ecological systems. Fruit are sold and take part in the economy of Peruvian Amazonia. **The insects**. In this survey, the authors present 18 species of insect pests observed in eight different localities in the surroundings of the city of Iquitos (Loreto, Peru) between 2000 and 2003. Among those species, four develop in the pulp of the fruit, two are borers of the rachillae, one is a borer of the trunk and the petioles of the young leaves, two species bore the rachillae and floral buds, one develops in buds of female flowers and another damages the base of the roots; eight of those species are considered as the most important pests: *Eupalamides cyparissias* Fab., *Antiteuches kerzhneri* Rider, *Stenoma* sp., *Clinodiplosis* sp., an unidentified species of Cecidomyiidae, *Tyrannion* sp. and two unidentified species of Curculionidae. **Discussion**. The cultivation of the dwarf *aguaje* is a good alternative to the cutting of the native palms to harvest the fruit, but the cultivated palms are damaged by insects. The planters must learn to know those pests to control them. The biology and the ecology of the new pests are currently being studied.

Amazonia / Peru / *Mauritia flexuosa* / dwarfs / pest insects

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Les insectes nuisibles au palmier *Mauritia flexuosa* L.f., forme naine, en Amazonie péruvienne.

Résumé — La plante. L'*aguaje* (*Mauritia flexuosa* L.f.) est un palmier amazonien en cours d'adaptation à la culture sous sa forme naine. En Amazonie péruvienne, il présente une grande importance sociale et écologique et participe à l'économie de la région. Les fruits font l'objet d'un commerce actif. **Les insectes**. Dans cette étude, sont présentées 18 espèces d'insectes nuisibles observés entre les années 2000 et 2003, par les auteurs, dans huit localités différentes des environs de la ville d'Iquitos (Loreto, Pérou). Parmi ces espèces, quatre se développent dans la pulpe des fruits, deux sont des foreurs de rameaux florifères, une autre creuse des galeries dans le stipe et les pétioles des jeunes feuilles, deux espèces sont des piqueurs de rameaux florifères et de boutons floraux, une autre se développe dans les boutons des fleurs femelles et une dernière attaque les racines. Huit de ces espèces sont considérées comme des ravageurs principaux : *Eupalamides cyparissias* Fab., *Antiteuchus kerzhneri* Rider, *Stenoma* sp., *Clinodiplosis* sp., une espèce non identifiée de Cecidomyiidae, *Tyrannion* sp. et deux espèces de Curculionidae non identifiées. **Discussion**. La culture de l'*aguaje* nain est une bonne option pour pallier l'abattage des palmiers effectué pour récolter les fruits, mais elle subit les attaques de divers insectes. Les planteurs devront apprendre à les reconnaître afin de les contrôler. La biologie et l'écologie des nouveaux ravageurs sont en cours d'étude.

Amazonie / Pérou / *Mauritia flexuosa* / nain / insecte nuisible

1. Introduction

Mauritia flexuosa (L.f.) is a dioecious palm tree which presents a broad distribution, from the eastern Andean piedmont to the Atlantic coast, and which follows the limits of the Amazonian basin from north to south [1]. The plant forms dense populations along the axes of drainage in savannas of northern Bolivia, in coastal savannas of Guyanes [2, 3], in the *llanos* of Venezuela [4, 5] and in the *pantanos* of the central and western part of the Amazonian basin [6, 7]. These formations are called *aguajales* in Peru, *buritizais* in Brazil, *canaguchales* in Colombia, *achuales* in Ecuador and *morichales* in Venezuela [1, 8].

Mauritia flexuosa L.f. is the palm tree which has the greatest social, economic and ecological importance in Peruvian Amazonia. All the parts of the plant are used: its fruits are rich in vitamins, proteins, lipids and minerals [9]. They are consumed in great quantity in the town of Íquitos. This market was studied [10]. The stipe is used to construct traditional houses and the petioles are used to make artisanal objects and other artefacts [11, 12]. Leaves are used to cover the roofs of local houses [13] and the fibers of the leaves are used by Yaguas natives to make traditional clothing [1, 13–16]. In Peru, there are various kinds of fruit called shambo and *amarillo*; they are characterized by their size, their color and their flavor [10]. The big size of these palm trees in the natural environment drives the collectors to cut the most productive plants to harvest the fruit. Each month, 1 000 palm trees are thus cut [17, 18], that is to say, 12 000 trees each year, a figure which can sometimes be doubled [10]. The removal of these palm trees involves an erosion of genetic inheritance in the long run and affects the balance of the *aguajal* ecosystem, if it is considered in particular that many animal species feed on the fruits and the seeds [1].

In Peruvian Amazonia, a dwarf form of *M. flexuosa* L.f. was observed; this plant bears fruit from 6–7 years old, well before the stipe develops. These *aguajes*, known as *shapishico aguaje*, develop on not easily flooded grounds (*tierra firme*), always scattered, and do not form settlements. Their multiplication was undertaken by the *Instituto de Investigaciones de la Amazonia Peruana* [10] which developed research on the cultivation and improvement of the production systems. Currently, the plantations of this dwarf *aguaje* constitute one of the best ways of conservation of natural populations, intensely overexploited. However, the development of the crops involves the proliferation of harmful insects.

The references describing the insect pests of the *aguaje* are scarce. Villachica [19] mentions the presence of leaf-eating Lepidoptera and *Rhynchophorus palmarum* in Iquitos. A Coleoptera Curculionidae, *Mauritinus seferi,* attacks the fruits in Brazil [20]. *Eupalamides cyparissias* is regarded as the principal pest of *aguaje* in the area of Iquitos [21], and three species of Miridae of the genus *Alvarengamiris* have been observed in various localities. However, they are not regarded as pests [22] and thus were not taken into account in our work regarding the insects harmful to this palm tree.

The inventory we achieved results from observations carried out in the area of Iquitos on dwarf *aguaje*, which are either isolated individuals, whose age is undetermined, or recently planted specimens resulting from seedbeds. Eighteen species of insects were characterized. Eight of them are regarded as pests to be imperatively controlled because they attack either the inflorescence or the fruit, or the palm tree itself, and can kill it. The other species are not regarded as very harmful at present (*table I*).

This study involved visiting as many sites as possible where the dwarf palm tree is indexed and cultivated, over several years and at various times of the year, in order to determine the plant health situation. It is a preliminary work which does not include quantitative information. Indeed, the populations of insects are in constant evolution depending on the age and the phenology of the palm trees.

The control methods used were those which can be reasonably implemented under the conditions of local agriculture.

Table I.
Various species of insects harmful to the dwarf *aguaje* (*Mauritia flexuosa* L.f.) in the area of Iquitos (Perú), classified according to their damage importance.

Type of species	Insect identification	Type of damage
Species considered as important[1]	*Eupalamides cyparissias* Fab.	Galleries in the stipe and rachillae
	Antiteuches kerzhneri Rider	Punctures on rachillae, fruits and floral buds
	Stenoma sp.	Caterpillars' mining of the galleries in rachillae
	Clinodiplosis sp.	Larvae destroying the female floral buds
	Cecidomyiidae not identified	Larvae causing galls in fruits
	Curculionidae not identified sp. 1	Larvae developing in the fruit pulp
	Curculionidae not identified sp. 2	Larvae developing in the fruit pulp
	Tyrannion sp.	Larvae developing in the fruit pulp
Secondary species[2]	*Brassolis sophorae* L.	Leaf-cutter caterpillars
	Opsiphanes cassina Felder	Leaf-cutter caterpillars
	Leptoglossus hesperus Brailovsky & Couturier	Larvae and adults puncturing rachillae
	Cerataphis brasiliensis Hempel	Presence of sooty molds
	Rhynchophorus palmarum L.	Larvae in the stipe
	Rhinostomus barbirostris Fab.	Larvae in the stipe
	Metamasius hemipterus L.	Larvae in the stipe and at the leaf base
	Strategus surinamensis Burmeister	Adults under the radicular plate
	Atta cephalotes L.	Leaf-cutter pests
	Trigona sp.	Adults feeding from the fruit pulp

[1] These insects cause losses in the production or harm the growth of the plant.

[2] In the area of Iquitos, damage is currently regarded as negligible for the dwarf aguaje's crops.

2. Materials and method

Our observations were carried out in various localities of Peru (*table II*). The climate of the area is tropical wet; the annual average temperature is approximately 26 °C, up to (35 to 36) °C. Annual precipitations are about 2600 mm.

Our study was carried out from December 2000 to December 2003. The insects were observed and collected on isolated adult palm trees, in private gardens, or in recent, experimental plantations, or in seedbeds.

The adult insects, directly identifiable, were captured with traditional entomological nets, killed and either prepared and dried, or placed in 70% alcohol, and provided with their complete references. The immature stages of the insects, caterpillars and other larvae, nymphs and chrysalides, were reared at the entomological laboratory of the IIAP (*Instituto de Investigaciones de la Amazonía Peruana*) in Iquitos. The insect-rearing was carried out on the vegetable organs on which the larvae had been collected (fruits, rachillae sections or leaves) and placed in appropriate cages or bottles. They were placed, for some, on a mixture of sand and fine sawdust, allowing nymphosis in the soil. Their development into adults made possible the identification and the connection between larvae and adults.

The identifications were carried out by H. Brailovsky (*Universidad Nacional Autonoma of Mexico City*, Mexico) and G. Couturier (*Muséum national d'Histoire naturelle*, Paris, France) for Coreidae; V.C. Maia (*Museu nacional of Historia Natural*, Rio de Janeiro, Brazil) for Cecidomyiidae; D. Matile-Ferrero (*Muséum national d'Histoire naturelle*, Paris, France) for Aphididae; D. Rider (*North Dakota State University*, Fargo, USA) for Pentatomidae; C.W. O' Brien

Table II.
Localization of the palm trees of *Mauritia flexuosa* F.f. which were visited to count the harmful insects colonizing species in Peruvian Amazonia.

Plantation	Locality	Department	Province	District	Coordinates
CIJH/IIAP[1]	Near to Jenaro Herrera	Loreto	Maynas	Requena	Lat. 04° 54' S Long. 73° 40' O
San Gerardo	km 17.5, Iquitos-Nauta road	Loreto	Maynas	San Juan	Lat. 03° 54' S Long. 73° 21' O
Univ. Ntl. Ucayali	Federico Basadre road, km 8	Ucayali	Coronel Portillo	Pucallpa	Lat. 08° 32' S Long. 74° 52' O
–	Near to El Varillal, km 13, Iquitos-Nauta road	Loreto	Maynas	San Juan	Lat. 03° 53' S Long. 73° 20' O
–	Iquitos	Loreto	Maynas	Iquitos	Lat. 03° 47' S Long. 73° 14' O
–	Pevas	Loreto	Ramón Castilla	–	Lat. 04° 08' S Long. 75° 73' O
–	Indiana	Loreto	Maynas	Indiana	Lat. 03° 29' S Long. 73° 02' O
–	Mazán	Loreto	Maynas	Mazán	Lat. 02° 04' S Long. 75° 73' O

[1] Jenaro Herrera Research Center (CIHJ) field station of the Peruvian Amazon Research Institute (IIAP).

(*Green Valley*, Arizona, USA) for Curculionidae and Dryophthoridae; and finally, V. Becker (Embrapa, Brasilia, Brazil) for Elachistidae. The other groups were identified by G. Couturier. Some of the insects could not be identified at a specific level.

The samples are deposited in the *Universidad Nacional Agraria Molina*, Lima (Perù), in the *Museu Nacional de Historia Natural*, Río de Janeiro (Brazil), in the *Muséum national d'Histoire naturelle*, Paris, France, and in the collections of the taxonomists who identified the specimens.

3. Results

Eight species of harmful insects directly causing losses in plant production or killing the palms were identified, as were ten other species, of secondary importance, whose damage has no – or little – impact on the productivity and development of the palm trees, in the current state of the crops.

The term "loss of production" was used when the damage to the buds of the female flowers involved their drying, when the damage to the formed fruits led to various malformations and partial disappearance of pulp, or when the attacks of insects boring into the rachillae caused a weakening of the stem. In addition, the presence of the latter on young subjects before the formation of the stipe always proved to induce the death of the plant.

This distinction between harmful species and species of secondary importance (*table I*) does not rule out a potential evolution of the degree of noxiousness of these species in the future.

3.1. Lepidoptera

3.1.1. *Eupalamides cyparissias* Fab. (Castniidae)

The adult of *E. cyparissias* Fab. is a moth with a robust body whose scale is (140 to 180) mm. It flies from 5:30 to 6:30 a.m. and from 5:30 to 7:00 p.m. The eggs are white, stretched and oval (*figure 1*), and deeply striated. They are (5 to 6) mm and easily recognizable. The caterpillar is between (110

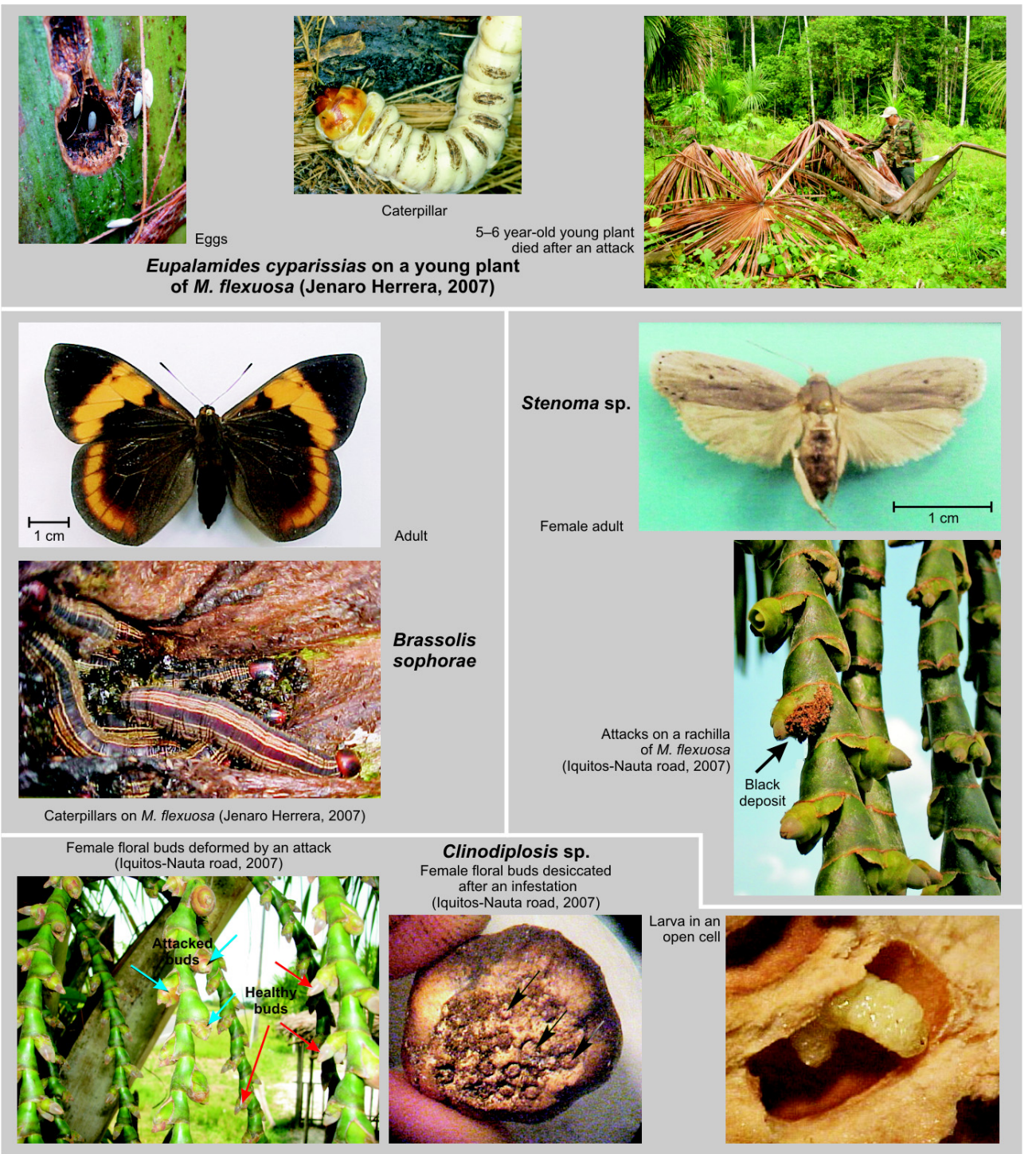

Figure 1.
Various developmental stages of harmful insects observed on dwarf *Mauritia flexuosa* in Perú.

and 130) mm (*figure 1*). The first stages feed on the epidermis of the petiole of the leaf, and then bore a gallery in the petiole, the inflorescence or the heart of the palm. The pupa is (64 to 95) mm long. It is protected by a compact cocoon made with fibers from the palm tree. On the *aguaje*, nymphosis generally takes place at the base of the petiole of the leaf.

The caterpillars cause damage to floral stalks, the petioles and sometimes the feather-grass. These attacks are spotted with the gum secretions exuded by the plant through the perforations made by the caterpillars. The larval galleries can reach 2.5 m long and 3.5 cm in diameter; they are sinuous and have irregular edges. The development of these galleries limits the circulation of the sap. When the attack takes place on an inflorescence, it is weakened; its flowers and its fruit fall or develop badly. In the case of an early attack, the flowers fall through and there is no production. In the localities where the evaluations [21] were carried out, the species *E. cyparissias* Fab. is, currently, the main pest of the *aguaje*. Its rates of inflorescence infestation are (83, 90 and 100)%. The attack can kill a young plant (*figure 1*).

The species *E. cyparissias* Fab. is also a pest with significant economic effects on the coconut (*Cocos nucifera* L.) and the oil palm (*Elaeis guineensis* Jacquin); it has been the subject of many works relative to its morphology, its biology, its damage and control [23–28].

In the local farming conditions, the larvae can be destroyed with the injection of an insecticide or the introduction of an iron wire inside the galleries.

3.1.2. *Stenoma* sp. (Elachistidae: Stenomatinae)

Stenoma sp. is a species not yet described in the scientific literature. The larva is purplish red, clearer on the central dorsal line. Its amplitude is approximately 25 mm at the end of its development. The adult is 35 mm wide (wings enlarged). The front wings are gray, the posterior are clearer (*figure 1*). The larva bores a gallery in the peduncle and the rachillae and enters into the buds. It can still develop on dry rachillae fallen on the ground. The caterpillars are easily spotted thanks to sawdust and silk threads deposited on the rachillae and buds (*figure 1*). The female of *Stenoma* sp. lays when the buds are differentiated and attacks both the male and female inflorescences. The insect causes the premature fall of the fruit. Up to four caterpillars per rachilla can be observed. The control of *Stenoma* sp. can be carried out by section and destruction of the part of the attacked rachilla.

3.1.3. *Brassolis sophorae* L. (Brassolidae)

The species *B. sophorae* L. is a common pest of the oil palm [25]. The adult is (70 to 105) mm wide (wings enlarged). The dark brown wings are more or less emphasized with broad oblique strips, which are yellow, on the front wings (*figure 1*). During the day, the caterpillars gather in a nest (*figure 1*) which can contain several hundred individuals; at night they get out to feed on the leaflets. On *M. flexuosa*, the damage is limited and occurs especially on young plants. Chemical control is currently not useful, but the nests of caterpillars must be destroyed.

3.1.4. *Opsiphanes cassina* Felder (Brassolidae)

Like former species, *O. cassina* Felder is common on oil palm, as on various indigenous palm trees where the caterpillars feed on the leaflets. The species is not frequent on *M. flexuosa* and does not require particular intervention.

3.2. Diptera

Two species of Cecidomyiidae were observed on *M. flexuosa*: *Clinodiplosis* sp. and another species not yet identified.

Eggs of *Clinodiplosis* sp. are laid at the base of the female bud which widens and swells in a characteristic way (*figure 1*), then stops developing and mummifies. Up to 15 to 20 larvae can be observed on a single female bud (*figure 1*). The number of buds attacked in the same way changes according to place and time. It can be about 10% of the total of buds formed on the palm. In the

case of considerable infestations, it is advised to cut and destroy the contaminated part of the rachillae.

The adult of the Cecidomyiidae species which is not identified is a 2.5-mm-long midge; it is black-headed with hyaline wings, a brown thorax and an orange abdomen.

The larva is white and very small: it measures 2.5 mm at the end of its development. It lives in a soft whitish gall, turning woody, which develops in the ripe or maturing fruit pulp. Its presence is spotted thanks to the observation of many internal galls inducing fruit malformation and seed ripening, which devalue the selling price (*figure 2*). To control it, infested fruit must be removed and destroyed. This pest is locally called *piojo del aguaje* or "louse of the *aguaje*".

3.3. Hemiptera

Leptoglossus hesperus Brailovsky & Couturier (Coreidae) is a pale chestnut brown bug with a light yellow irregular, transverse fascia on the median part of the hemelytra. The adults are (15 and 19) mm long (*figure 2*). They appear at the beginning of the flowering and colonize the rachillae where they reproduce. A few days later the first larvae appear. They prick the floral buds and the fruits; these punctures induce fruit malformation. There can be up to 30 or 40 larvae on the same inflorescence. This species was recently described, with specimens collected in various localities close to Iquitos [29]. It is the latter species of *Leptoglossus* which is closely associated with a palm tree; the other species, *L. lonchoides*, which lives on *Bactris gasipaes* H.B.K., is regarded as a significant pest for this other palm tree cultivated in the area of Manaus [30, 31].

Antiteuchus kerzhneri Rider (Pentatomidae) is a brown to dark brown stink bug which is (9.5 to 11) mm in length (*figure 2*). The adults and the larvae prick the developing fruit under development and make them fall when they are abundant. They appear at the emergence of the bract ("spathe" of the inflorescence). The species can develop several successive cycles and infest the whole inflorescence, and then the infrutescence. One can observe more than one hundred individuals on only one inflorescence. *Antiteuchus kerzhneri* was observed for the first time in the locality of Mazan and has now been spotted in various localities in the area of Iquitos. It was recently described [32]. The only efficient means of destruction is the pulverization of an insecticide, with weak remanence, at the start of the infestation to limit the risk of residual pesticides.

3.4. Homoptera

The adult of *Cerataphis brasiliensis* Hempel (Aphididae) has an oval body, green when alive; it is surrounded with a characteristic white wax fringe. It is (1.5 to 3.5) mm long. The larvae and the adults form colonies on the base of floral stalks and can invade all the inflorescences and infrutescences. Sweetened secretions of the aphid induce the proliferation of sooty mold, a fungus which covers the fruit with a black pulverulence (*figure 2*); they must thus be washed before being sold. The primary symptoms are the whitish coloring of the colonies, followed by the black coloring of the sooty mold.

This aphid was observed for the first time in 1928 on *Rhaphia vinifera* K. by J. Ghesquière, in the Belgian Congo, and in 1942 on *Cocos nucifera* L. in Campiñas in Brazil, by H.F.G. Saber, like on the orchises *Epidendrum* sp. and *Cattleya harrizonia* in São Paolo, Brazil [33]. This species is also quoted as *Cerataphis palmae* G., *C. variabilis* H.R.L and *C. fransseni* H.R.L. These names are synonymous with *C. brasiliensis* [33]. This pest should be eliminated from the plant as soon as the first colonies appear.

3.5. Coleoptera

Three species of Curculionidae whose larvae develop in the fruit pulp were observed. Two of them were not identified, and we mentioned them as species 1 and species 2; the species 3 is *Tyrannion* sp.

The adult of species 1 (subfamily: Baridinae) is brown colored; it presents scales on the elytra; the length of the body without the rostrum is 8 mm (*figure 2*); the larva is

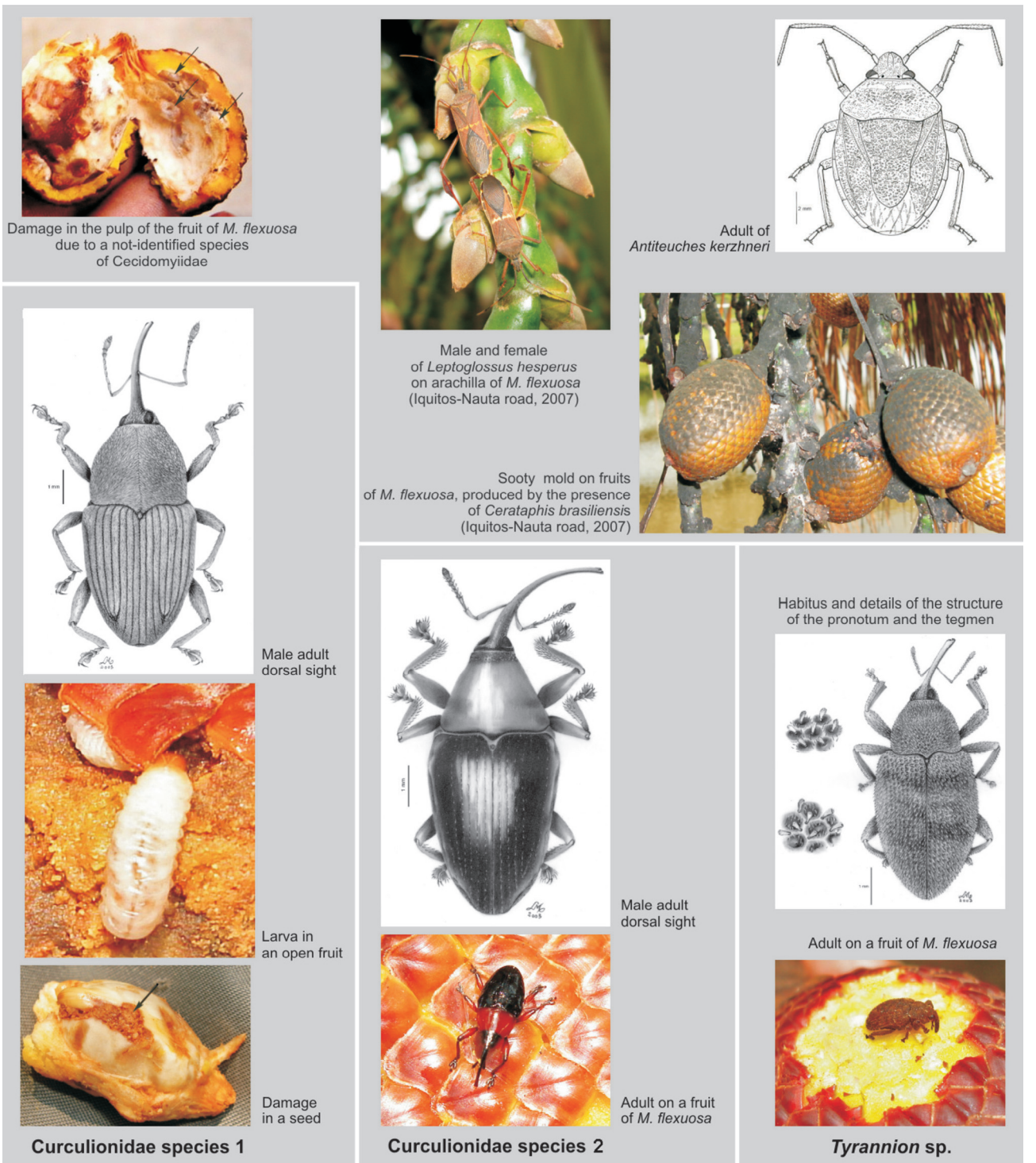

Figure 2.
Adults and harmful damage of insects observed on dwarf *Mauritia flexuosa* in Perú.

pinkish white with a translucent longitudinal line (*figure 2*).

The adult of species 2 (subfamily: Baridinae) has a black, shiny body; the color of the prothorax and the legs is shiny red-orange; the length of the body without the rostrum is 8 mm (*figure 2*); the larva is yellow.

The adult of the species *Tyrannion* sp. (subfamily: Cryptorhynchinae) is light brown with black spots on the elytra; the elytra, as well as the pronotum and the legs, are distinctly foveolate, covered by scales and setae, often flattened (*figure 2*); the larvae are yellowish white.

These three species of Curculionidae cause the same damage: the larvae feed on the fruit pulp and cause their premature fall. However, species 1 can attack the fruit prematurely when they are about 15 mm long. It can also enter the seed when the fruit is larger (*figure 2*). The attacked fruit cannot be sold. The nymphosis of these species takes place in the ground for (8 to 10) days. It is essential to eliminate the contaminated fruits.

Rhynchophorus palmarum L. (Dryophthoridae) is a large weevil, entirely black, usually faintly shiny or not, which is (29 to 44) mm long and (8 to 11) mm wide; its scutellum is large, quite visible and makes it possible to distinguish it from the close genus *Dynamis,* often confused with *R. palmarum*. The males are smaller than the females and have a silk brush on the rostrum [34]. *Rhynchophorus palmarum* is a well-known pest of the oil palm (*Elaeis guineensis* Jacquin) and coconut (*Cocos nucifera* L.); its biology, its behavior and control methods were studied [23, 35, 36]. In Peruvian Amazonia, the species was observed on young seedlings of the palm tree *Bactris gasipaes* H.B.K in Iquitos [31]. On the dwarf *aguaje*, the females lay their eggs on the wounds caused by the cutting of the leaves or in fortuitous wounds. The larvae feed on the soft parts of the plant and cause its death when they are numerous. Manual elimination or attractive trapping (aggregation pheromone, sugar cane) are advised to control this pest.

The adult of *Rhinostomus barbirostris* Fab. (Dryophthoridae) is brownish black. Its size varies from (15 to 45) mm long; the rostrum of the male is adorned with long and dense silks [25]. The larvae develop in the trunk of the palm. On the *aguaje*, the species is not very frequent and does not cause notable damage. It is, however, recommended to avoid a potential population increase with the ageing of the plantations. For this purpose adults should be eliminated.

Metamasius hemipterus L. (Dryophthoridae) is a weevil, light brown or yellowish with black spots. It is (12 to 14) mm long. This insect is a pest of sugar cane and banana; it is common in the plantations of oil palm and on the Amazonian native palms, but it never reaches dangerous densities for the cultivated palm trees [30]. On the aguaje, it is sporadically observed. The larvae live at the base of the foliar sheaths of the old leaves; they feed on the skin and the soft parts of the petioles and can bore small galleries in the sheaths of the leaves. These species do not require any particular strategy of control.

The adult of *Strategus surinamensis* Burmeister (Dynastidae) is dark brown and is (30 to 38) mm long and (13 to 18) mm wide; the male is smaller than the female and presents three short horns on the pronotum. The larvae are "white worms" and feed on the wood in decomposition. The adults are harmful to the palm trees [31, 37]. On the aguaje they cause some damage in the young plantations; they enter the ground to reach the radicular plate where they dig cavities sometimes looking like the appearance of galleries. In the event of attack of several adults on the same palm, the base of the roots is detached easily and the plant dies. To control the insect, it is necessary to eliminate the dead wood piles in which the larvae develop.

3.6. Hymenoptera

The leaf-cutting ants, *Atta cephalotes* L. (Formicidae), can cause significant defoliation in the seedbeds. Their nests must be spotted quickly and destroyed before they become too large with oil or an adapted insecticide. An old nest can be several meters deep and therefore very difficult to destroy.

Trigona sp. (Apidae) is a black colored bee. These insects are not abundant on the *aguaje*. They feed on the pulp of the developing fruit but because of their small number on this fruit, they do not cause noticeable damage. However, up to three bees on the same fruit can be observed, but that is rare.

4. Discussion

In the natural environment the fruits of the palm tree *Mauritia flexuosa* are collected by cutting the plant, which obviously puts an end to the production of the palm and represents a considerable ecological waste.

The cultivation of the dwarf form of this palm tree is promising. It will make it possible, in the future, to avoid cutting the plant in the natural environment. However, in local crop conditions, the dwarf palm tree is attacked by several species of insects which reduce its output. Some of them, among those which are presented in this study, can indeed induce the death of the inflorescence or infrutescence, or the palm tree itself. That is particularly true concerning *Eupalamides cyparissias* (often quoted in the literature as *Castnia dedalus*), and it is necessary to check that *Rhynchophorus palmarum* does not proliferate in the plantations of *M. flexuosa* where it is still observed in few numbers. The two species *E. cyparissias* and *R. palmarum* are traditional pests in the plantations of oil palm, where they must be constantly controlled. With regard to the aguaje, the absence of preliminary studies on the species described at the time of our work or not still named makes their control more difficult. The planter should, however, identify the attack of the main pests of this crop and observe his palm trees regularly in order to act early and to cut the infested parts. It does not seem that climatic factors have a direct impact on the insects of the inflorescences and infrutescences, which are closely related to the phenology of the plant.

Our preliminary study on the harmful insects of the dwarf form of the palm tree *Mauritia flexuosa* F.f. in Peruvian Amazonia will be used as a basis for the prevention of these species with respect to plant health attacks. The biology and the ecology of recently described species are currently being studied, as is the search for rational methods to fight them, within the scope of an integrated control concept.

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Los insectos plagas de la palmera *Mauritia flexuosa* L.f., forma enana, en la Amazonía Peruana.

Resumen — La planta. El "aguaje" (*Mauritia flexuosa* L.f.) es una palmera frutícola nativa de la Amazonía, en proceso de domesticación en su forma enana. En la Amazonia Peruana tiene alta importancia económica, social, ecológica y agroindustrial y da lugar a un comercio intenso. **Los insectos**. En este estudio los autores presentan 18 especies plagas observadas en ocho localidades cercanas a la ciudad de Iquitos (Loreto-Perú) entre 2000 y 2003 sobre el aguaje enano. Se determino que cuatro afectan los frutos, dos son barrenadores de raquis y raquillas, una barrena el estípite y las hojas jóvenes, dos son picadores de los raquillas y de los botones florales, una se desarrolla en los botones florales hembras y una ataca la base de las raíces. Ocho de estas especies son consideradas como plagas principales: *Eupalamides cyparissias* Fab., *Antiteuchus kerzhneri* Rider, *Stenoma* sp., *Clinodiplosis* sp., una especie de Cecidomyiidae no identificada, *Tyrannion* sp. y dos especies de Curculionidae. **Discusión**. El cultivo del aguaje enano es una buena alternativa al corte para cosechar los frutos, pero las plantas cultivadas están atacadas por insectos. Los agricultores tienen que aprender a reconocer las plagas para combatirlas. La biología y la ecología de las nuevas plagas están en curso de estudio.

Amazonia / Peru / *Mauritia flexuosa* / enano / insectos dañinos