

## LITERATURE REVIEW

The genus Oryctes was created by Illiger in 1798 in his "Verzeichniss der Käfer Preussens." The Rhinoceros beetle was originally described by Linnaeus in 1758 as Scarabaeus rhinoceros. In 1840 Castelnau stated that the genus Oryctes differed from Scarabaeus in that its mandibles are without teeth at the apices; the external side of the mandibles do not show noticeable teeth. The posterior legs are very thick and enlarged at the apices.

Lacordaire (1856) accepted the genus described in 1830 by the Russian entomologist and gave it a place in his *Histoire Naturelle des Insect.* Bertin (1919, 1920) accepted the genus Oryctes as it was defined by Lacordaire and tried to include all the previous works in the genus Oryctes.

The Rhinoceros beetle was first recorded on coconut palms by Ridley in 1889 in the Strait Settlement. It occurs in India, Philippines, Burma, Thailand, the Malay Peninsula, Cambodia, Vietnam and Laos, Hainan as far as Celebes, Ceram, Amboina (Arrow, 1910; Lecfmans, 1920) and Africa (Gressitt, 1953).

The Rhinoceros beetle first entered the South-Pacific area in 1909, when it was introduced into Samoa with rubber

plants from Ceylon into Somoa (O'Conner, 1953). The beetle has also been introduced into Wallis Islands, New Britain, New Ireland, Palau, Tonga, and Fiji. After the war the beetle was found to be established in Bismark Archipelago, territory of New Guinea, and also in the Caroline Islands, north of equator. In February, 1952, it was discovered in Vavau and had been there for some considerable time. The Palaus are the only islands in Micronesia where it has been found (Gressitt, 1953).

Of the 42 recorded species of Oryctes, only four are present in South East Asia or New Guinea and of these four species only two are in Thailand. Fifteen are found in Africa, 14 in Madagascar, two in Mauritius and one each in islands called Reunion, São Thome, Camoro Island, Socotra Island, Rodrigues Island and the Conary Islands.

Of the 25 species which attack palms, 15 attack coconuts. Oryctes rhinoceros has 29 host genera, 16 of which are palms (Goonewardena, 1958).

The Rhinoceros beetle is common from India to the Philippine Islands, wherever large palms abound. In Africa its place is taken by O. monoceros and O. boas, which attack palms in the same way. In Madagascar are six other species of palm-attacking Oryctes. In the Island of Reunion

there are two species. Tropical America has a closely allied genus, Strategus, which furnishes at least one species of similar habits. Allied genera, Pimelopus and Scapanes in New Guinea, and Camelonotus in America, attack young palms, burrowing into their stems from the ground (Burkill, 1913).

Eleven species of Oryctes occur in Madagascar, and five species in the islands of the Comores Archipelago (Paulian, 1959 ; Bedford, 1968).

The insect does all its damage in the beetle stage. It attacks many other palms besides coconut, and breeds in their decaying wood. Hutson (1922) mentions the occasional occurrence of its larvae in "dead and decaying stumps of old dadap and jungle trees." Friederichs and Demandt state that in Samoa few or no species of trees are rejected for oviposition (De Mel, 1931).

Banks (1906) states that the beetles attacks are confined to the soft tissues near the top of the tree, and holes seen in the trunk below this point. "The attack always begin during the night and by the following morning it will frequently have entered so far into the burrow as to be protected from the light. It then continues its feeding until a gallery of considerable size has been excavated."

The larvae are found in a variety of other situations and appear to have a remarkable power of adapting themselves to circumstances. They will flourish in rotten wood, decaying leaves, sawdust, manure heaps etc. (Arrow, 1910).

The black beetle had been declared a pest as far back as 1907 in Ceylon. The damage is done by the beetle stage which bores in the crowns of healthy young and older bearing palms for the purpose of feeding on the juice or sap which flows from the wounds which it makes (Hutson, 1922). It is considered that Oryctes rhinoceros (Linn.) prefers coconut to oil palms, but this insect may become an important pest of oil palm if conditions are favorable (Corbett, 1927). Corbett (1932) also stated that there are three species cause similar damage to coconut palms, namely, O. rhinoceros (Linn.) is found in Malaya, Labuan, Indo-China etc., O. trituberculatus Lansb. in Malaya and the Dutch East Indies and New Guinea. The most important species in Malaya is O. rhinoceros. Ladell (1928) wrote in his paper on the control of the coconut beetle in Bangkok that the rhinoceros is known to attack not only the coconut trees but also many other kinds of palms. The cultivation of coconut in Burma is fast decreasing, chiefly owing to the ravage of O. rhinoceros (Linn.) which also attacks other

palms (Ghosh, 1923).

Vestal (1956) wrote an article of the coconut beetles and weevil in Thailand in a FAO Plant Protection Bulletin, he said that the rhinoceros beetle is widely distributed in Thailand. The typical pattern of its injury may be seen in most coconut-growing areas. Its major damage to the palm is the wound inflicted which serve as entrances to the red weevils. The adult is a large shiny black beetle. The male has a short horn on its head, and curving backward.

Oryctes gnu Mohn. was originally described by Mohnike in 1874 as Oryctes gnu which he found in Western Indonesia. In 1879 Lansberg found the beetle in Sumatra and Celebes which is larger than O. rhinoceros. He named the beetle as Oryctes trituberculatus.

Benchitr, wrote a short paper suggesting that there are two species of coconut scarabs, the larger being O. trituberculatus and the smaller O. rhinoceros and he reported that O. trituberculatus is found only in Takbai district area, Province of Narathiwat.