

Coconut Pest Alert!

Onslaught of Coconut Palms by the lethal Pest Red Palm Weevil, *Rhynchophorus ferrugineus*, in Terengganu

by:

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The state of Terengganu produced 11,220 metric tonnes of coconut on 2,440 hectares area, mainly along the 225 kilometers of BRIS, sandy soil coastal area. The magnificent crowns of coconut trees along the coastal area depict the serenity and the tranquillity of the state. Since 2005, the onslaught of the red palm weevil, *Rhynchophorus ferrugineus*, or more commonly referred to as the Asian Palm Weevil, had reduced the coconut trees to standing poles, devoid of the lush leaf crown (Fig.1). The devastating effect of the weevil was only realised when many dwarf variety coconut trees at the Department of Agriculture (DOA) Station at Rhu Tapai was losing their leaf crown. A preliminary evaluation on the extent of damage based on visual symptom of suspected damage by RPW in 2007 by Plant Protection unit of the DOA, revealed that the damage had spread to 58 localities in all the seven districts of the state of Terengganu, stretching from Besut district in the north, bordering the state of Kelantan, to district of Kemaman in the south, bordering the state of Pahang. Apparently, the RPW damaged was confined to trees along the coastal areas.

How did *R. ferrugineus* kill the coconut palm?

When adult female lands at the leaf crown, it starts to bore hole in the soft tissue of the cabbage with the tongue-like plate at the terminus of the snout (Fig.6) and deposited the eggs. The eggs hatched as a grub (Fig.6), which feed and bore through the soft tissues of the cabbage of the crown (Fig.7D) as it developed into the pupa. The pupa enveloped itself in the cocoon constructed from the fibrous tissue of the developing rachis of the leaves or the surrounding fibrous tissues around

the cabbage. Several cocoons can be found at the base (Fig.7A) and along the rachis (frond) of the leaf (Fig 7B) and the drier tissue surrounding the cabbage. Ultimately the grub emerged from the cocoon as an adult weevil (Fig 7C) and mate with the opposite sex (Fig.8) to continue the life cycle. Being a monocot, coconut has only a single growing bud. Once the cabbage is destroyed the apical shoot die and break, leaving the set of crown of leaves below with developing fruits still intact (Fig.9). It will take another year before the damage palm is reduced a standing trunk denuded of the leave crown, reducing the plantation to the scene in Fig.1.

Threat of *R. ferrugineus* to other palms!

Malaysia is a home to about 4 million hectares of oil palm, a stable income source to many small holders and the Federal Land Development settlers of the country. *R. ferrugineus* is a lethal pest to date palms (*Phoenix dactylifera*) in the Middle East and Mediterranean countries. In 2010, the species was threatening the ornamental palms in Southern California, USA, which brought Dr Mark Hoddle, Biological Control Specialist and Principle Investigator, University of California, Riverside, to Terengganu (Fig.12). *R. ferrugineus* is classified as quarantine pest A2/339 by the European and Mediterranean Plant protection Organization, Rome, "a quarantine pest present in that area but not widely distributed there and being officially controlled". Eleven species of palm have been list as host of *R.vulneratus* including oil palm (*Elaeis guineensis*) in Malaysia by Murphy and Brisco (1999). Presently, the State Department of Agriculture Terengganu is rehabilitating the coconut palms in the

states, replacing the old Malaysian tall varieties with hybrid varieties of matak and Pandan (personal communication with Hj.Yusof Lazim, State Director of Agriculture Terengganu). The red palm weevil is a challenge to the success of the program.

How easy can you control the pest and save the palm?

It is not easy to control the pest and save the palm. Initial attack on the palm does not produce any detectable symptom or tell telling sign. By the time you realised the plant is already invaded by the weevil, it is too late to save the palm. The larvae have already damage the cabbage and the growing point, though the emerging shoots continue to grow and develop until the nutrient supply from the crown is cut off. Besides, there are other palms host to the weevil, among which are betel nut (*Areca catechu*), Sagu (*Metroxylon sagu*), nibong palm (*Oncosperma tigillaria*) royal palm (*Roystonea regia*) and kabong palm (*Arenga saccharifera*). Prophylactic treatment with monocrotopos as a trunk injection is currently being employed in some of the plantations. It is a class 2 insecticide under the Malaysian Pesticide Board listing, which requires a licence to administer. Application to palm in production, especially pandan variety which is harvested green for its sweet aromatic water as a fresh coconut drink, may contain traces of the chemical, though there is no report yet. An alternative safe and effective control of the pest is by mass trapping using synthetic aggregation pheromone. It had been reported effective in suppressing the weevil population in a date farm in Israel after two years using high density mass trapping (Soroker, *et.al.*, 2005). Currently, the synthetic pheromones

is being used to determine the distribution of *R.ferrugineus* and *R.vulneratus* in the coconut palms in the state of Terengganu.

How did the weevil come to Terengganu?

R.ferrugineus had never been documented present as a lethal coconut pest in Malaysia, though an important pest of coconut in the neighbouring countries (Murphy and Briscoe, 1999). Only *R.vulneratus*, then known as *R.schach* was established as a lethal pest of coconut in the coconut growing area in the west coast of peninsula Malaya and sago palm in sarawak. Ironically, the species referred to as *R.schach* only reported in Malaysia, but not globally and not even in the neighboring countries of

Phillipines, Indonesia and Thailand. Today what was known in Malaysia as *R.schach* is *R.vulneratus*. *R.ferrugineus* is introduced with the date palms imported to Kelantan and Terengganu for landscaping the Mosques in the state. In, Kuala Terengganu, practically all the date palm trees landscaping the Floating mosque in Kuala Ibai are all killed by the red palm weevil, *R.ferrugineus* (Fig.14)

This is the first report on the onslaught of *R.ferrugineus* on coconut palms in this country. The lethal damage caused by the weevil changed the landscape of the coconut palms along the 225 kilometres coast line of Terengganu. The synthetic aggregation pheromones evaluated apparently is effective in luring the weevil into the trap. Present work to determine the distribution of the weevil in the

coconut plants along the coast of Terengganu is a very encouraging. The next strategic control measure for the success of the coconut rehabilitation program of the state are:

- i) To cut down all coconut palms showing sign of weevil infestation and destroy all stages of the life cycle of the weevil in the cabbage and the fronds
- ii) To carry out mass trapping using aggregation pheromones lure at high density trap per unit area.
- iii) To extend the control of the weevil to coconut farms in the neighboring state of Kelantan.
- iv) Strict enforcement of quarantine law on entry of life palm into the country. Life importation of life date palms from outside the country must be completely prohibited.



Fig.1. Scene of a small coconut holding severely infested by *R. ferrugineus* at Merang, Kuala Terengganu. Poles of coconut trunk decapitated by the weevil dominate the holding.

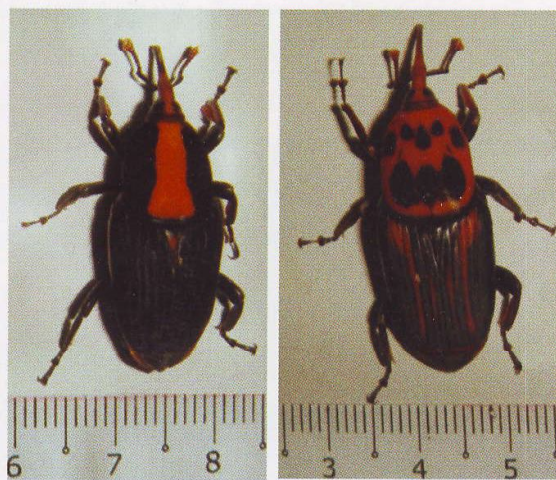


Fig.2. *R.schach* (now *R.vulneratus*) (A) and *R. ferrugineus* (B). Note the distinct presence of the reddish brown longitudinal band in the centre of the black pronotum and black elytra in A, as opposed to the black spots on the reddish brown pronotum and reddish brown longitudinal bands alternating narrow black stripes on the elytra in B.



Fig.3. Variation in spot size, number and distribution of the black spot on the reddish-brown pronotum of *R. ferrugineus* from samples collected in Terengganu.



Fig. 4. Symptom of fan-shaped jagged leaves damaged by *O. rhinoceros* beetle still able to produce reduced number of fruits per bunch at the base of the frond.



Fig.8. Mating of adult weevils with the male riding on top of the female to produce the next generation of siblings.



Fig. 9. The apical young leaves dried and snapped (arrow) leaving a set of between 12 to 14 leaves below supporting the developing fruits.



Fig. 12. Dr Mark Hoddle, Biological control specialist and Principle Investigator, University of California, Riverside discussing on the *R. ferrugineus* caught in the pheromone trap at Department of Agriculture Station, Rhu Tapai, Terengganu, with Head of Plant Protection Terengganu and Director of Plant Protection, Department of Agriculture, Kuala Lumpur.



Fig. 6. Micrograph of the terminus of the snout of *R. ferrugineus* with the tong-like apex formed by tridentate mandible use for boring hole in the cabbage of the coconut crown to deposit the eggs.



Fig.7. Several cocoons in the base tissues (A) and along the leaf of the frond (B). Mature section of the frond an adult weevil emerging from the cocoon (C). The crown split into half longitudinally with the cabbage partially damaged by the feeding grub (arrow) (D).

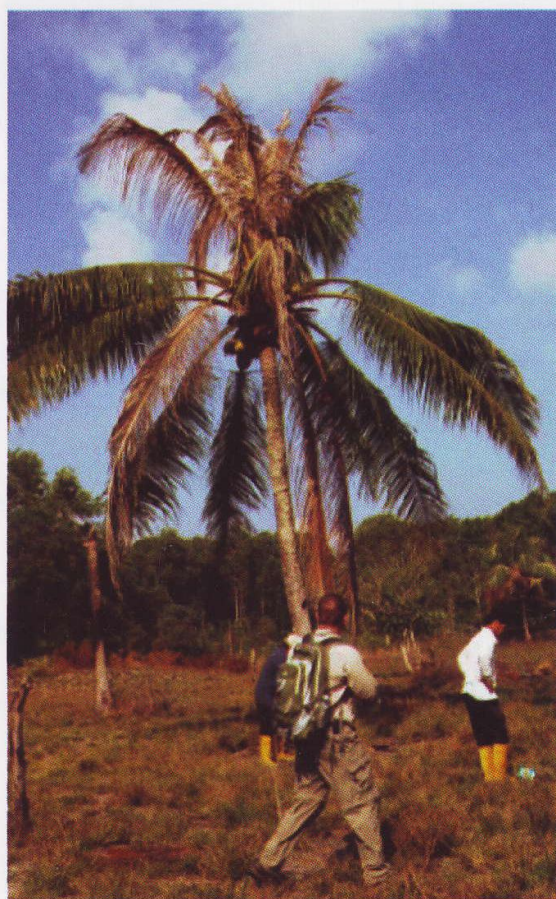


Fig.10. Felling a *R. ferrugineus* damaged palm at Rhu Tapai to collect the weevil samples in the crown.

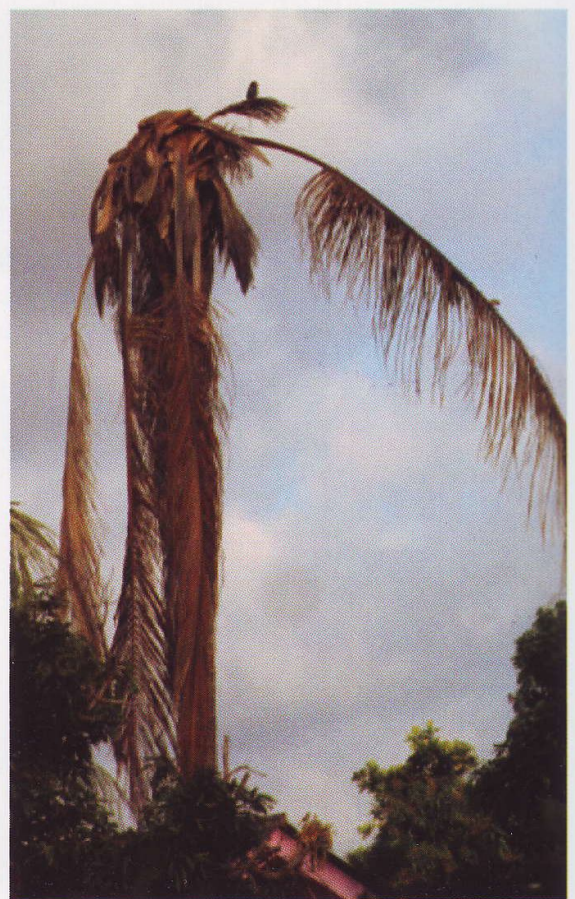


Fig. 11 The faith of the palm a year or so later after apical shoot collapsed (Fig.9) due to onslaught of *R. ferrugineus*. The surviving leaves died and drop off the crown.