



MALAYSIA

# Prevention and Management of Invasive Alien Species

Certain foreign species are officially listed by the country's regulatory agencies as dangerous exotic species as these are potential threats to agriculture (plants, crops, animals, livestock), non-cultivated ecological systems and human beings once these species enter and establish themselves in the country. In general, the management strategies and control measures of such species aim to prevent or deny their entry, to eradicate, to contain, or to effectively control them should their entry and establishment occur. Legislation, regulations and procedures are provided to legalise and smoothly implement these measures. Both the Plant Quarantine Act of 1976 and the Plant Quarantine Regulation of 1981 provide the legal framework in dealing with dangerous exotic pests of plants. Effective implementation of these Acts could help prevent the introduction or establishment of alien species.

Plant quarantine is the first line of defence in managing invasive pests of plants in the country. The Department of Agriculture, which enforces the quarantine law, has stationed 250 enforcement officers in all the 49 entry points to inspect all agricultural goods that are brought into the country. Agriculture products or consignments found to be infested with live pests are held at a secured area at the port of entry until the pests shall have been identified. If the pest is positively identified as a quarantine pest, the consignments are either seized and destroyed or sent back to the exporting country. For the year 2000, a total of 580 consignments with 82 species of arthropods were intercepted. Of the total, only three species were gazetted as dangerous pests under the present act and regulation.

Besides immediate quarantine action at entry points, plant quarantine inspectors are given the authority to isolate the premise or any area and to conduct direct eradication treatments as necessary. The first effort to contain and eradicate plant pests in Peninsular Malaysia was in 1986 when the cocoa pod borer (*Conopormpha cramerella* Snellen)

started to spread beyond control. This initial effort has failed probably due to the wide area that the pest had already infested when it was first detected, making containment rather difficult and ineffective. Later, two other eradication programmes were implemented following the detection of two dangerous exotic pests namely: Khapra beetle (*Trogoderma granarium*) and the golden apple snail (*Pomocea* spp.).

When it was first detected, the Khapra beetle was found only in one isolated rice godown and it was successfully eradicated. However subsequent attempts

to contain and eradicate the golden apple snail proved unsuccessful as the snail had already widely spread in several areas including irrigation canals when it was first detected. Also, there were no effective and viable methods available to control the snail. In addition, there were no other attempts made to eradicate

any pest even though numerous introductions of exotic pests had occurred. It is believed that since these pests were detected only when they were already widely spread, their containment and eradication was not a viable option.

Pest management strategies have changed when exotic pests became invasive, that is, they appear to be permanently established and spread widely. In general, they are no longer treated as quarantine pest, but are regarded as a common pest. As such management is no longer focused on eradication but aimed at reducing the population and the effects or damages. The cocoa pod borer is a classic example of a quarantine pest that lost its status. Today, it has become the most serious cocoa pest in Malaysia. Control measures are ongoing to maintain the population and infestation below the threshold level so that economic loss could be avoided. In general, control measure should be a combination of chemical and cultural methods. Other control methods are used if these are not effective and available.

Research bodies either government or private have played important roles in helping regulatory



and extension bodies in managing invasive species. They have developed better technologies that are more effective and more environment-friendly. For example, at the beginning of the cocoa pod borer infestation, its control depended much on the heavy use of pesticides. Later, better control methods were developed which achieved the same control objective, as that when pesticides were used. Proper fruit harvesting and introduction of biological agents had significantly controlled the cocoa pod borer infestation. Integrated pest management has been developed for another invasive species, *Plutella xylostella*, a serious pest of crucifers. Several biological agents were imported and released. A few of them have been successfully established and have played a major role in regulating this pest. Other major management components include crop scheduling and using environmental friendly pesticides such as insect growth regulator and bio-pesticides.

### Agencies Involved in Managing Invasive Species

Management of invasive species is the responsibility of government agencies. Most of the alien species that have been brought into the country are quarantined and checked by the Department of Agriculture and the Department of Veterinary Services. Control strategies and technologies are made available by research and extension bodies, but the implementation of control measures as a preventive and curative action is the responsibility of individual growers. Extension agencies such as the Department of Agriculture play an important role in advising the regulatory agencies, individual growers as well as the general public on the effective measures to control a particular pest.

However, until today, there are no agencies in the country that are working specifically on the biological invasion. There is also no detailed study conducted on IAS nor any comprehensive or coordinated monitoring and cataloguing of invasive species. A listing of major alien, invasive or pests of Malaysia may be seen in the Country Report of Malaysia by Mat Hassan Othman and Abdul Kadir Abu Hashim entitled "Prevention and Management of Invasive Alien Species". An elaboration of the more important invasive alien species is given below.

### Invasive Species and their Impacts

**Cocoa pod borer** (*Conopormopha cramerella* Snellen): This pest was first detected in Sabah in August 1980. Initially, infestation was confined to some 4,000 ha cocoa plantings in Tawau, Sabah. However, by mid 1983 or within two and a half years, all major cocoa growing areas in Sabah

were infested. Within the same period, the pest had found its way into, and established itself, in the neighbouring state of Sarawak. In Peninsular Malaysia, the cocoa was free of the pest until 1986 when it was detected in about 700 ha of cocoa in Melaka. Subsequently, the pest was detected in nearby cocoa areas and other major cocoa growing areas. Up till today, the borer is the most important insect pest of cocoa in the country. Although overall economic loss is difficult to ascertain, crop loss in badly infested holders can be very severe, and a loss of up to 30% is not uncommon.

#### **Diamondback moth** (*Plutella xylostella* L.):

Accordingly, the insect was introduced into Malaysia due to three reasons: 1) most of its preferred host were imported plants; 2) there are few endemic natural enemies of the Diamondback moth (DBM) in Malaysia; and 3) The genus *Plutella* in the country is poorly represented and only one species is known. The insect was first recorded in Malaysia in Fraser



**Cocoa pod borer**



**Diamondback moth**

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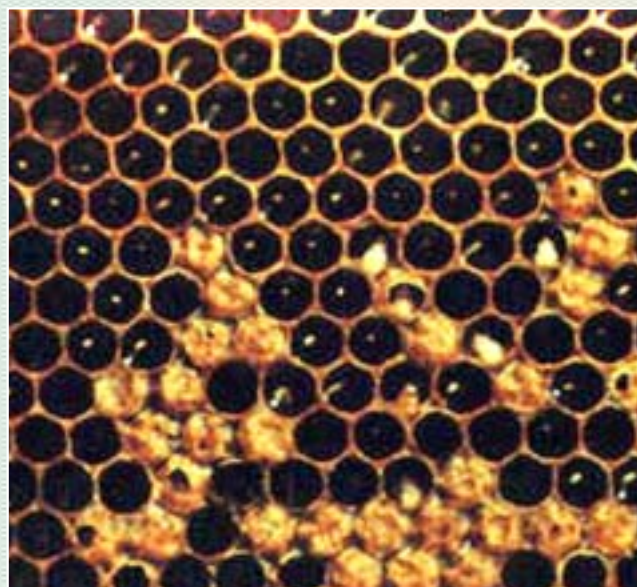
Hill in 1925. By 1934, the insect was found in Cameron Highland, which was then newly opened for cultivation of temperate vegetables. By 1941, it was reported that DBM was a major pest of cabbage in the Cameron Highland. Today the DBM is the most serious pest of *Brassica* in the country. It is the major pest in both the highland and lowland areas where cabbage and crucifers are grown. Outbreaks and high incidence of infestation are reported yearly.

**Beet armyworm** (*Spodoptera exigua*): The beet armyworm is an important crop pest and widespread in sub-tropical, tropical and temperate regions. The pest was first detected in 1996 attacking hot pepper crops in Ayer Hitam Johore. Subsequently small outbreaks of *Spodoptera exigua* were reported in other parts of Johore and Melaka. Now, *S. exigua* has become an important pest of various crops such as onions, brinjal, legumes, chili and crucifers.

**Golden apple snail** (*Pomacea* sp.): The snail was illegally brought into Malaysia for commercial purposes. It was first detected in fishponds in Puchong and Subang, both in Selangor in 1991. The snail species found in Puchong has been identified as *P. insularis* and in Subang, *P. canaliculata*. Following the discovery, a nationwide survey was conducted to detect the presence of the snails. The survey showed that the snail was found only in a few isolated areas such as fishponds, unused tin mines, aquarium, and in a small ricefield at Kg. Pengkalan Semeling, Kedah. Control measures aimed to contain and eradicate the snails were implemented. The measures succeeded only in slowing down the spreading. In some areas the snails made their way to nearby rivers, water drains, irrigation canals and ricefields. Currently, the snails have been detected in about 5,000 ha of rice fields in Perak but there are no reports of serious damages to the rice plants caused by the snail.

**Papaya ring spot virus** (PRSV): The disease, which originated from South America, was first detected in the southern part of Johore in 1991. Following the discovery of PRSV in Johore, a nationwide survey was conducted twice a year to detect the disease. Results of the surveys showed that the PRSV occurred only in the southern part of Johore while the rest of Malaysia, including Perak – the second biggest papaya producer state after Johore – is still free from PRSV.

**Citrus greening disease:** Citrus greening is a highly destructive disease of citrus caused by the bacterium *Liberobacter asiaticum* and it probably originated from China. How it came to Malaysia is



**Sacbrood**

not yet known and it was only in 1989 that the presence of the greening disease was confirmed in the country.

**Sacbrood virus disease:** Sacbrood is an infectious virus disease that affects the brood of honey bees. In early 1994, *Apis cerana cerana*, which is known to be more productive than the native bee – *Apis cerana indica* – was imported from Southern China with the objective of improving local honey production. The imported colonies were kept in Sungai Burung Selangor and Merlimau Melaka for quarantine observation. After 6 months of introduction, sacbrood, which was previously unknown, was found to have infected the nearby colonies of the native bee (*Apis cerana indica*). The disease spread and within 6 months, almost 100% of the native bee colonies was wiped out. Since then containment measures have been implemented to prevent its spread. The measures employed were successful, confining the disease in Selangor, Melaka, Johore and Terengganu.

Other IAS include the itch grass (*Rottboellia cochinchinensis* Lour); water hyacinth (*Eichhornia crassipes* Martius); aquarium watermoss (*Salvinia molesta* Mitchell); Timor deer (*Cervus timorensis*); red-eared tortoise (*Trachemys scripta elegans*); house crow (*Corvus splendens*), and the Philippine glossy starling (*Aplonis panayensis*).■

\*Excerpts from the paper entitled "Prevention and Management of Invasive Alien Species" presented by **Matt Hassan Othman** of the Department of Agriculture, and **Abdul Kadir Abu Hashim** of the Department of Wildlife and National Parks during the workshop on "The Prevention and Management of Invasive Alien Species: Forging Cooperation through South and Southeast Asia" held from 14-16 August 2002 in Bangkok, Thailand.