Developments of the Oil Palm Pollinator, *Elaeidobius kamerunicus* in Malaysia

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The pollinating weevil

The oil palm pollinator *Elaeidobius kamerunicus* is a tiny weevil belonging to the order Coleoptera of the family Curculionidae. The *E. kamerunicus* adults feed and breed on male inflorescence of oil palm at anthesis i.e while the flowers are releasing pollen. The adults do not feed on the pollen grains but only on the inner parts of male flowers. The average life cycle of the weevil takes about three weeks.

The function of the weevil

The main role of the weevil is in pollination, whereby pollen is transferred from the anthesising male to female flowers. This is possible because both the male and female flowers exude an aniseed odour at anthesis which attracts the weevil adults. The aniseed odour is ascribed to the compound called P-methoxyally benzene or estragole. The weevil is undoubtedly recognised as the most efficient and reliable insect pollinator in the oil palm ecosystem.

Reasons for introduction

Elaeidobius kamerunicus originated from Cameroun, West Africa. This weevil was introduced into Malaysia in late 1981 for the following reasons: Firstly, prior to the introduction of the weevil, a situation of inconsistencey and inadequacy of oil palm pollination was prevalent amongst the young palms in Malaysia and palms of all ages particularly in Sabah. This situation arose because the local pollinator, *Thrips hawaiiensis* provides adequate pollination only on older palms in Peninsular Malaysia. Secondly, the practice of assisted pollination (whereby pollens were artificially dusted onto anthesising female bunches of young palms between 3 – 8 years old and older palms in Sabah) was expensive. In 1982 alone, had assisted pollination been undertaken, the national expenditure for assisted pollination would have been in the region of M$50 million. It should also be added that assisted pollination, was a labour-intensive operation and the prevalent chronic shortage of labour in the oil palm plantations would have rendered such a practice uneconomic and impracticable.

Research associated with the weevil

Several years of research preceding the introduction of the weevil to Malaysia conducted in the Cameroun and Malaysia showed that *E. Kamerunicus* is the most effective pollinator.

During the quarantine period of six months as required by the Dept. of Agriculture, Malaysia it was found that *E. Kamerunicus* was extremely host specific. This means that it was safe for introduction and the possibility of it turning into a pest to other crops would be very remote.

Currently in PORIM, there are three research projects covering various aspects: the biology and population dynamics of the weevil, effects of the weevil-pollinated bunches to the palm oil mills and effects of the weevil on oil palm bunches. Research on the second aspect has been completed as far as the entomological viewpoint is concerned while research on the other aspects are actively pursued. Research is focussed on establishing the threshold weevil population necessary for effective pollination and also ensuring that the pollinating efficiency of the weevil can be sustained in various climatic conditions of Malaysia.

Besides these entomological aspects, research on the effects of the weevil on palm production, palm physiology, palm nutrition and harvesting standard are also being undertaken. Various aspects of research pertaining to the weevil are also being undertaken by the industry. These include weevil population census, effects of weevil on rat population, long-term effects of weevil on bunch components, effects on harvesting and ripeness standard and product recovery at the mills. A number of these projects are done in collaboration with PORIM.

Effects of the weevil

Within a year after the introduction of the weevil into Malaysia, a significant impact of the weevil has been felt by virtually all sectors of the plantation industry, from harvesting operations in the field to the oil extraction in the mills. Various government and private research agencies have closely monitored this development through their own research project. In order to assess the current status of knowledge on the impact of *E. kamerunicus* to the oil palm industry and to exchange research ideas on this pollinator, PORIM and the Malaysian Oil Palms Growers' Council jointly organised a two-day Weevil Symposium in February 1984. The resultant proceedings should prove useful in identifying future research programmes on the weevil which could fulfill both current and future needs of the industry.

Some of the effects of the weevil on the oil palm industry could be summarised:

(i) Dispensing with the need for assisted pollination thus saving an estimated M$50 million annually.

(ii) Based on records from PORIM and various plantation agencies, the following effects on oil palm pollination and bunches have been recorded comparing pre- and post-weevil data:

- Significant improvement in fruit set from an average of 52% to 71%.
- Increase in fruit to bunch ratio from an average of 57.7% to 64.7%. (The pollination of oil palms is considered satisfactory if the weight of the fruit constitute 60% of the total bunch weight).
- Increase in mean bunch weight from 14.6 kg to 18.7 kg.
- Improvement in oil to bunch ratio from a mean of 23.3% to 25.4%.
- Improvement in kernel to bunch from 4.6% to 6.6%.

Current trends based on bunch analysis and weevil population studies data indicate there has been no unfavourable decline in the pollinating efficiency of the weevil,

(iii) Both increase and decrease in oil extraction rates since the weevil introduction have been reported by the mills but the difference between pre-weevil and post-weevil extraction rates has been marginal, only in the region of 1%. Theoretically, there should be quite a marked increase in oil extraction rate at the mills (by a factor of 2.4% to 4.8%) because of the general improvement in oil to bunch ratio. The slight increase in oil extraction or the decline in oil extraction rate is mainly attributable to inadequate sterilisation and unstripped bunches. It should be added that inspite of counter measures taken to overcome the problem of inadequate sterilisation, the problem of obtaining maximum oil recovery or maximum oil extraction efficiency at the mills still remain unresolved.

(v) Effects on oil palm production in the past two years are as follows:– In 1982, the first year after the introduction of the weevil, crude palm oil (CPO) production registered an increase of 24% (when compared to the previous year), 12% of which was estimated to be the contribution of the weevil. During the same year, the palm kernel production registered a considerable increase of 54%.

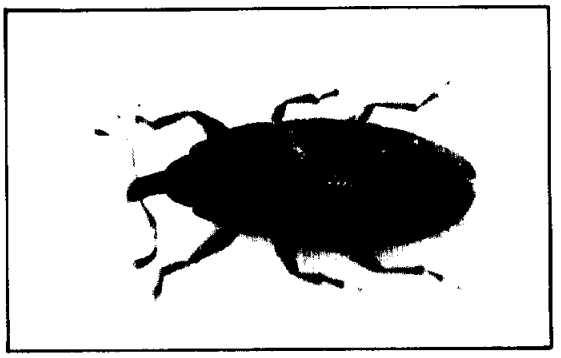
In 1983, there was a significant decline in the national production of CPO by 14%. There was also a drop in kernel production by 8%. Such a decline was believed to be due to the stress of increased production in 1982 as well as unfavourable weather conditions prevailing during certain months of 1981 and 1982 causing a decline in the sex ratio (which is the ratio of number of female to total inflorescences). This decline in sex ratio led to the marked reduction in bunch numbers and therefore yield.

The production of CPO in 1984 was 23% higher than that of 1983 while for palm kernel the increase was 25%. This increase indicates that the palms have made the anticipated recovery from the 1982 stress.

Conclusion

Findings at this junctive strongly indicate that pollinating oil palm using the weevil *E. kamerunicus* is safe, practicable and economic. Nonetheless various aspects of research pertaining to the weevil are being pursued to ascertain the long term effects.

The weevil is here to stay and oil palm yield is expected to stabilise in the future.



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