



Upstream Issues in Sarawak Oil Palm Industry and Research Gaps

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Current Urgent Issues & Challenges in Sarawak

- As the peat plantings get older and bigger areas of peat lands are being developed for oil palm cultivation, the Peat estates in Sarawak generally encounter serious problems in the following areas:
 - Pest & Disease
 - Poor Fruit-sets
 - Bunch Failures
 - Peat yellowing & lower frond desiccation
 - Palm Nutrition in Peat plantings
 - Areas of collaborative research between industry members & MPOB to find effective solutions to these issues

Pest & Disease

- Currently Tirathaba bunch moth off late has become a serious pest that cause much economic losses to the peat estates in Sarawak
- Termite though is a serious pest but is under good control by many estates but **much still has to be done to keep this pest under good control**
- Rat damage is getting serious in many estates especially the northern state of Sarawak. Other estates have to feed back !
- The other leaf pests such as bag worms and nettle caterpillars though was being reported but is still not serious that could turn serious if awareness among the planters is lacking.
- Red Palm weevils which is a serious pest in coconut has shown its presence in oil palm estate though has not been seen to inflict any damage but need close monitoring before it turns into a major problem if we neglect and overlooked.
- Oryctes beetle if not well controlled is a big nuisance in both mineral and peat planting retarding the vegetative growth of palms causing much economic losses.
- BSR & USR remains a major disease that is causing low palm stand and low yields in mineral areas particularly replantings and palms in peats even during the first planting

PESTS

- Rodent pests - Rat
 - Besides the normal species of rats that damage the fresh fruit bunches, the emergence of a “new” species called swamp rat - *Sundamys muelleri* is reported to be causing much damage to FFB in Sarawak plantations
 - The normal baiting regime does not seem to be effective -severe baits shyness problem and seems to be rather resistant to the rat poison
 - Causing serious damage to FFB particularly the young bunches by cutting into the shell and feed on the young tender kernel causing much economic losses
 - Need to carry out immediate research into finding an effective baiting method and baits to control the rat population
 - To determine if there may be other species of rat such as *Bandicota indica* etc as reported in the West that is among the “new” species causing serious damage to FFB and need to find an effective way of checking the population explosion

Sundamys muelleri – Swamp Rat





Damage by Swamp Rat



Rat Damage on tall palms



Oil Palm Bunch Moth



Tirathaba Bunch Moth

- The bunch moth is serious in most peat estates and is very serious in certain localised environment causing serious damage to fruit bunches and low OER & KER
- Need to research into the alternate host of this pest, it's adult population in the plantation besides controlling the larva
- Need to find an effective and economical methodology of control
- Need to look into an effective means of biological control using other bio-agents besides Bt
- Pheromone trapping of adults and or light trapping etc !!!

Severely Infested Fruit Bunches



Young severely Infested Male & Female Inflorescences



Different stages of male inflorescence were infested by bunch moth



Severe Infestation
Male Inflorescence



Termites

- There are many species of termites found in oil palm fields, especially in peat but mostly are scavengers that do not harm the palms.
- *Coptotermes curvignathus* is one common termite pest specie that is found attacking oil palm planted in peat.
- It can attack at any stages of palm age. Easy to detect in shorter young palms but in tall palms, it is difficult to detect the termite presence inside the palm bowl
- Not sure if there was any documented economic losses figure caused by termite by any researchers but we have noted not less 10% losses of palm stand in some serious infestation plots.
- If no proper census and control measures taken, palm stand loss is expected to be very high.
- The pest can be brought to good control with a proper monthly census and treatment rounds carried out (SOPB experience)

TERMITES

Coptotermes curvignathus



luk talien palm termite infested
at bote area 5/1/09



Termite Queen of *Coptotermes curvignathus*



Oryctes Damage in young Oil Palm Planting



Oryctes rhinoceros beetle

- Serious in oil palm replanting and some localised peat plantings
- Could seriously inflict palm casualty and retard the vegetative growth on damaged palms
- Cause highly uneven palm stand and low yield
- Can damage palms of all ages
- Can cause high losses to yield and a crop loss of >50% was ever reported in the first year of production.
- Right preventive and curative measures are important in order to control beetle damage

Leaf Eating Caterpillars & Bagworms

- Bagworms outbreak is endemic in some parts of West Malaysia and is difficult to bring under good control until today
- The pests are not uncommon in Sarawak and are present in many regions in Sarawak. Though still not alarming but can become serious if no concerted efforts are given to control and tackle this pest
- SOP for bag worm control should be published and distribute to the industry at soonest

Other Leaf Eating Pests

- Many other species of leaf eating caterpillars are also recorded in many parts of Sarawak
- Leaf pests can cause serious loss in yield of 40% had been reported if defoliation was up to 50% (Wood et al)
- If neglected in the early mild stage of infestation will lead to very serious outbreak that would be hard and tedious to control.
- **A thorough understanding of their life cycles and method of curative and preventive measures are important for everyone to note and put into practice.**
- The IPM approach has proven to be rather effective in controlling the pests

Red Palm Weevils

The infographic illustrates the life cycle of the Red Palm Weevil (RPW) in a circular flow:

- RPW Dewasa** (Adult RPW): Hidup 2-35 bulan. Four adult weevils are shown.
- Betina Bertelur** (Female Laying Eggs): 38-381 Biji, Menetas Dalam Masa 1-6 Hari. An image shows eggs inside a palm seed.
- Tempoh Pupa** (Pupa Stage): 11-45 Hari. An image shows a pupa.
- Kitaran Hidup** (Life Cycle): 45-139 Hari. Keseluruhan Pusingan Hidup Berlaku Di Dalam Batang Pokok. An image shows a palm trunk with a hole.
- Lanya Mempunyai 3-9 Instar Ambil** (Larva has 3-9 instars). An image shows a larva.
- Keluar Pupa Dibuat** (Pupa exits by making a hole). An image shows a hole in a palm trunk.

Below the infographic, a photograph shows a hand holding a single Red Palm Weevil. To the right, a collection of various RPW color variations is displayed under the heading "Pelbagai variasi RPW di Malaysia".

(*Rhynchophorus ferrugineus* & *Rhynchophorus vulneratus*)

Poor Fruit Sets

- The plantations in Sarawak in particular the peat estates are facing serious problem of poor fruit formation
- The problem seems to be serious during certain season and the fruits appear poorly pollinated
- Causing very low OER & KER
- Need to ascertain the cause
- Not sure if poor pollination was the sole cause of it, may have to study into the pollinator factor or other factors!

Poor Fruit sets

Not pest induced

Caused by bunch moth





Ununiformed Small Fruitlets
were being formed

Poorly formed bunches





Oil to Bunch: **7.23%**
Kernel to Bunch: **1.70%**

Mill Potential OER: **6.18%**
Nut to bunch: **2.75%**



Remarks: **Poor Formation**

Mill Potential OER: 6.74%

Nut to bunch: 2.36%

Oil to Bunch: **7.88%**

Kernel to Bunch: 0.87%



Oil to Bunch: **7.08%**
Kernel to Bunch: 0.86%

Mill Potential OER: 6.05%
Nut to bunch: 1.43%



Bunch Failure

- Seasonal and localized but is most rampant in peat areas
- Well formed and pollinated bunches just rot away before ripening.
- Need to find out the causes and was it partly caused by any nutritional disorders !!
- Appears to be more serious in certain marginal soils
- Causing much economic losses to those affected estate
- Not sure if it was weather and pollinator related too !!

Bunches Failed to ripen & turn Rotten







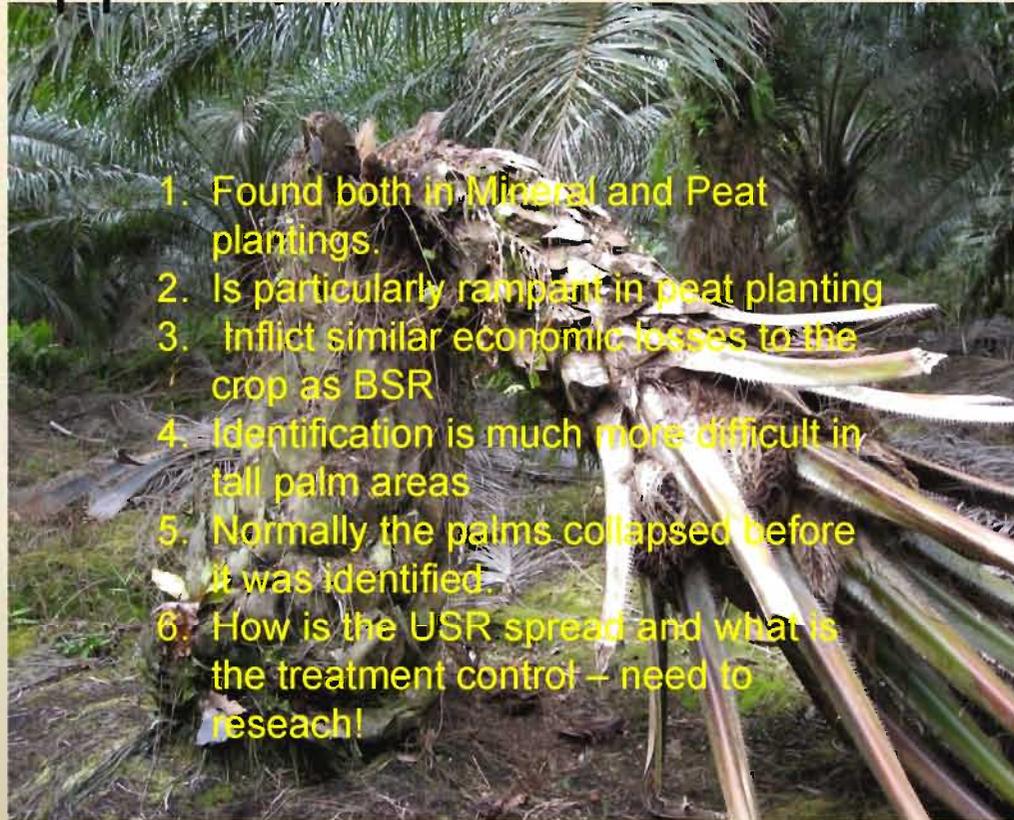
Basal Stem Rot - Ganoderma



1. Shorten the economic life of palms
2. Yield loss and lower OER as well
3. Serious in Mineral soils and Peat plantings
4. Need a judicious approach in replanting techniques to control and check its outbreak
5. Taking preventive control measures during replanting
6. Curative treatment of infected palms using fungicide and microbes/lipid ester
7. The respective speaker will present in greater details later in their presentations



Upper Stem Rot-Ganoderma



1. Found both in Mineral and Peat plantings.
2. Is particularly rampant in peat planting
3. Inflict similar economic losses to the crop as BSR
4. Identification is much more difficult in tall palm areas
5. Normally the palms collapsed before it was identified.
6. How is the USR spread and what is the treatment control – need to research!

Lower Frond Desiccation

- This is apparent as the palms grow older
- We have identified one factor as the low pH of below 3.5 and palms in soil of about pH 3 show serious drying of the fronds.
- Palms in potential acid sulphate shallow peat also exhibit serious frond yellowing
- Industry members have tried out heavy liming that seems to have addressed the problem but there is a paper from MPOB citing liming is counter productive. We need to relook into the subject matter and establish a comprehensive guidelines to address such problem





An extreme case of frond desiccation caused by low pH





**Palms Recovered After heavy
Liming**

Acid Sulphate soil



Palm Nutrition On Peat Soils

- Long term palm nutrition research on peat is much awaited in view of the numerous issues raised above regarding bunch failure, poor fruit sets etc.
- Peat nutrition recommendations in peat are much more delicate in view of various serious constraints in peat soils as against mineral soils.
- The fast build up of acidity in peat after many years of inorganic fertilizer applications warrants a thorough research to look into alternative fertilizer regime by using more organic fertilizers in particular to K source and micro nutrients

Areas of Research to plug the gaps

- We would propose for the Industry members and MPOB to collaborate and jointly set up the following areas of research:
- Short Term Research
 1. Find an effective and economical methodology of controlling bunch moth infestation using chemical and bio-insecticides
 2. Besides controlling the larvae of bunch moth, need to research into the alternative host plants and pheromone and or light trapping methods to control the adult moth.
 3. Besides the tedious way of chemical control and trapping *Oryctes* beetle, need to find other effective biological method of controlling the pest in peat and replanting
 4. A new baiting method and an improved rat baits to tackle the emergence of “new” intruder - ***Sundamys muelleri*** dominating the oil palm estates now and causing much economic losses in terms of poor fruit sets and poor OER

Medium to Long Research

1. Find an effective method of detecting termite infestation on tall palms and a better and more effective method of controlling this pest . There are good ai that can destroy the colony but need to look for a more effective mode of delivery(application) to attract bait acceptance
2. Palm nutrition research to provide a site specific nutrient needs of palms in the various peat types in Sarawak
3. Palm nutrition needs of the current high yielding materials
4. Find a more effective and economic ways of addressing the low Ph in peat to address the declining yield
5. Research to determine the factors causing poor fruit sets in Sarawak and find the remedies
6. Close observation studies are also needed on Red Palm weevils and the red palm algae that are rampant in estates

Conclusion

- What are being presented above are not the only issues but there could be more and we hope members could raise them during the afternoon workshops.
- However we need to focus into the more pertinent and pressing issues and challenges like those mentioned earlier.
- The Sarawak Industry members especially SOPB and Ta Ann Groups are ever willing to carry out joint R & D programmes with MPOB to look into those issues mentioned and we hope that other companies can also volunteer to do the same for the benefits of the industry.
- Last but not least, we wish to thank the DG of MPOB and Director of Biology for taking great interest and effort to look into our issues and problems.

Thank You

For Your Kind Attention