Workshop

"Natural Rubber Systems and Climate Change"

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Impact of climate change on diseases and pest outbreaks on rubber tree

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- Climate change nowaday is globally recognized fact.
- The changing climate not only influences the crop growth and development but also has serious impacts on diversity, distribution, incidence, reproduction, growth, development, and phenology of diseases and pests.
- It is likely to alter stages and rates of development of the pathogen, modify host resistance, and result in changes in the physiology of host-pathogen interactions.

- It is expected that the range of many insects, diseases will expand or change and new combinations of pests and diseases may emerge when current natural ecosystems respond to altered temperature and precipitation profiles.

- A plant disease is the result of interaction among a susceptible host plant, virulent pathogen, and the environment.
- Changes in any of the components of the disease triangle can dramatically affect the magnitude of disease expression in a given pathosystem.
- It is not surprising that disease patterns have already changed and will continue to change in response to the effects of climatic changes on pathogens and hosts.

- The weather parameters have an important role in triggering and spreading pests and diseases in natural rubber.
- It implies that climate change will modify patterns of rubber disease and pest distribution.
- It may increase or decrease the incidence of some diseases and pests by changing the conditions that would trigger an outbreak..

- Almost all pests and diseases known to affect natural rubber have been existing since long ago.
- However, some of them that were minor in nature have become major and some prevailing only in nurseries are occurring in mature trees also.
- Changes in severity and pattern of occurrence have also been noted.

- Some rubber diseases changed their relative importance, such as, Oidium secondary leaf fall (OLF), Corynespora leaf fall (CLF) were more severe under climate change.
- Phytophthora abnormal leaf fall (PLF) occurred in new rubber planting area where this disease had not been recorded.
- Recently, unexpected diseases, i.e. Pestalotiopsis leaf fall has occurred.

- On the Oidium leaf fall (OLF) disease, changes in the rainfall, increasing temperatures, mist and high humidity can increased the incidence of this disease.
- The OLF can reduce rubber yield up to 45%.
- OLF is a significant limiting factor for rubber production areas, especially in high humidity areas.
- The occurrence of OLF is increasing rapidly.
- Climate change is one reason for this because it increases the possibility of climatic conditions that allow for epidemic levels of OLF outbreaks.

- The favorable weather conditions for Corynespora leaf fall (CLF), is saturate humidity and high temperature (26-30^{o}C).
- So, CLF usually occcurs and develop when weather has rain under hot condition, such as at the end of dry season and beginning of rainy season.
- In Vietnam CLF was first detected in 1999 and after 10 years, it has broken out due to favorable weather conditions.
- More than 20.000 ha were affected.

- The weather conditions affected by global climate change, as warmer temperatures, erratic rain... is favorable conditions for CLF recurrence.
- Nowadays, CLF has emerged in almost rubber growing area in Vietnam.
- CLF become one of the most threatening diseases of rubber in Vietnam now and future.

- The climate change also is one of the factors that contributed to the outbreak of a new disease which was believed to be caused by *Neofusicocum* sp. and now could be due to *Pestalotiopsis* sp., *Colletotrichum* spp. and/or some unknown fungi.
- The first outbreak of the disease was from Indonesia and Malaysia in 2017.
- Later it became more seriously in Indonesia, Malaysia then appeared in Sri Lanka, India and Thailand.

- End of 2019, the total infected area was above 520,000 ha, in which Indonesia was over 387.000 ha; Malaysia was nearly 10,000 ha; Thailand was 122.530 ha; and Sri Lanka was around 1.000 ha.
- It severely affect the health of the rubber trees and causing significant reduction in latex yield.

- Rubber trees were also attacked by a variety of pests.
- Several pests that have found on rubber trees however only some pests that could significantly damage the trees such as termites, cockchafers grubs, spidermites, scale insects, bark feeding caterpillar and mealy bug.
- Although pest incidence on rubber tree is relatively low, it is also found to be on the rise because of warming temperature in recent years.

- In conclusion, climate change may alter the current scenario of diseases and pests on rubber tree.
- These changes will certainly have effects on productivity.
- Therefore, studying the impact of climate change on important plant diseases and pests is essential to minimize yield and quality losses, helping in the selection of strategies to work around problems.

- Interdisciplinary approaches, preferably by international programmes, must be adopted to assess the effects of climate change on diseases and pests on rubber tree.
- The complexity of the processes involved and their relationships require communication between professionals in the various areas concerned.


Thanks for Your Kind Attention