ABSENCE OF TAPPING PANEL DRYNESS IN MEXICO HAS TO BE INVESTIGATED UPON

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Abstract

It is still disputed as to whether Tapping Panel Dryness (TPD) of Hevea brasiliensis is a physiological syndrome caused by abiotic factors or a disease caused by pathogen. Exact causative factor is still unknown. Majority opinion is that TPD is caused by some abiotic factors. It was also believed that TPD occurs in all countries where rubber is cultivated. However, in 2013 it was reported that TPD does not occur in the rubber plantations in Mexico. The popular clones of rubber trees cultivated in Mexico are IAN 710 and IAN 873. Clones RRIM 600 and PB 260 are also cultivated in a very small area. So far no one has contested this observation published in 2013. Since TPD is a major problem in rubber plantations in Asia and Africa, further investigations have to be conducted to confirm the observation and find out the possible reasons for the absence of TPD in Mexico. Data from past clone trials in Asia consisting of clones IAN 710 and IAN 873, if available may be re-examined for incidence of TPD. If not, new trials may be taken up on these clones for testing in Asia. If TPD occurs, other reasons can be ascribed for the reported absence of TPD in Mexico.

INTRODUCTION

Though Tapping Panel Dryness (TPD) is a significant problem, making the bark of rubber trees under production dry and unproductive, the actual cause of TPD incidence is unknown. Most of the researchers believe that TPD is caused by abiotic factor/s. Some attribute it to biotic agents.

A second type of tapping panel dryness associated with necrosis of the bark in the base of the tree, Tapping Panel Necrosis (TPN), is also commonly observed (Nandris et al., 1991 a, b). A tree affected by TPN also does not show any physiological problem related to growth or reproduction. TPN is also considered to be a physiological syndrome.

Many factors cause increased incidence of TPD. Frequency of tapping (Vijayakumar et al., 1990; Sulochanamma et al., 1992; Vijayakumar et. al., 2001; Karunaichamy et al., 2001), frequency of chemical stimulation of latex flow (Chrestin, 1989; Rajagopal et al., 2004) , environmental stresses (Nandris et al., 2004) etc. are some of the major factors that are attributed to increased incidence of TPD. Injurious

deep tapping damaging the inner layer of cambium also causes increased latex flow and increased incidence of TPD (Karunaichamy et, al., 2001). Genetic differences in susceptibility to TPD are also well established (Vijayakumar et al., 1990). Fungal diseases affecting stem also cause increased incidence of TPD as secondary problem.

However, reports of direct effects of biotic agents in TPD are scanty. Possible association of viruses with TPD was reported from Malaysia in 1965 (Peries and Brohier (1965). Detection of Rickettsia-like organisms (RLO) in TPD affected trees was reported from China (Zheng et al., 1982; Zheng et al., 1988) and viroids or low molecular weight viroid like RNA from India (Ramachandran et al., 2000). However, TPD does not show typical characteristics of a disease caused by plant pathogen. Till today there is no chemical or biological control measure that can prevent or cure TPD. The only preventive measure available is low frequency tapping (Vijayakumar et a., 2005)

Nandris et al. (2004) and Peyrard et al. (2006) could not find any association of viroids with TPN. Nandris et al. (2004) ascribed TPN to be associated with soil water stress. Wongcharoen et al. (2011) reported associations between TPN and macro fauna diversity and soil enzyme activities. Groups of ants and termites were associated with the soil under healthy and trees affected by TPN respectively.

Tapping panel dryness was considered to occur in all countries where rubber trees are commercially cultivated. Surveys have indicated that 10 -15 % of trees are fully affected by TPD in the downward tapped area (base panels) of the trunk (Chen, 1996; Nair, 2004).

Overall reduction in dry rubber production on account of TPD is assumed to be 12- 20% (Commere, et al., 1989) . However, cases of high incidence of TPD due to various reasons (Karunaichamy et al., 2001) and heavy reduction of more than 50% production are also common.

On the invitation of Inter American Institute for Cooperation in Agriculture (IICA), Mexico City and Secretary of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA), Mexico, under specialist program, the author was in Mexico during 23 November- 22 December 2011 (Vijayakumar, 2013). The mission was to inspect the rubber plantation industry in Mexico and to give advice for improvement and expansion. Mexico has rubber plantations in 29,400 hectares, of which 18,700 ha is under mature trees producing rubber. The popular

clones of rubber trees cultivated are IAN 710 and IAN 873. Clones RRIM 600 and PB 260 are also cultivated in very smallarea. Rubber cultivation is mostly in the four southern states of Oaxaca, Veracruz, Tabasco and Chiapas. Almost all planters are small holders. The author visited two research stations, many rubber nurseries, plantations and processing factories. There were presentations and discussions in the research stations and eight extension centers. In Mexico there are only two scientists delegated for research on rubber cultivation. Rubber plantation industry in Mexico is very much isolated from the international community of natural rubber producing countries.

In none of the 20 mature plantations, including the old ones, visited by the author, trees with tapping panel dryness could not seen. This came to notice on the very first day of the field visit to the research farm at Campo Experimental "El Palmar" del INIFAP in Oaxaca. TPD could not be seen even in a 40 year old plantation visited in Oaxaca. Absence of TPD is in spite of very harmful practices of latex harvest prevalent in Mexico, these being high frequency tapping, opening of trees before attaining optimum girth of 50 cm, too deep tapping causing heavy injury to the cambium and high frequency stimulation(Fig 1). The matter was discussed with the two scientists, all the extension officers and planters. Salient features of TPD were also explained. All of them are ignorant of TPD syndrome.

The absence of TPD in a rubber growing country was first reported following the visit (Vijayakumar, 2013). However, there were no comments or further reports on the observation. Only information received was from Rubber Research Institute of India (RRII) that it started fresh studies on the two Brazilian clones IAN 710 and IAN 873.

Absence of TPD observed in Mexico indicates that a biotic factor might be involved in the development of TPD and that the factor is absent in Mexico. Role of abiotic factor or factors peculiar to Mexico in preventing development of TPD cannot also be ruled out. The observation demands further studies on the reasons for the absence of TPD in Mexico. Such studies can help in identifying the factors causing development of TPD and probably in evolving control measures. It is suggested that the IRRDB may call upon member countries to take up further studies. Such studies will be useful to deal with the serious problem of TPD of rubber trees faced by rubber growers.

CONCLUSIONS

Absence of TPD in Mexico, reported in 2013 may be subjected to further investigations by member countries of IRRDB. It is suggested that the IRRDB may call upon member countries to take up further studies. Such studies might help in resolving the problem of the incidence of TPD, especially when injurious tapping is done.

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