

## **DRY ROT DISEASE MANAGEMENT IN HEVEA USING SYSTEMIC FUNGICIDES**

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Six systemic fungicides were evaluated for the control of dry rot (*Ustilina deusta*) disease of *Hevea brasiliensis*, cultivar 600 over three seasons in a high rainfall area. Rubber kote was used as carrier for the fungicides. Hexaconazole (0.02% a.i.) had consistently given effective control irrespective of the stage of the disease at the time of treatment. The systemic fungicides afforded better disease control when compared to the currently recommended contact fungicide (TMTD 0.75% a.i.).

### **INTRODUCTION**

Dry rot disease (*Ustilina deusta* (Hoffm.ex Fr. Lind)) is one of the contributing factors for reduction in mature tree stand in rubber plantations particularly in high rainfall regions. The fungus infects the tree trunk or branches and causes disintegration of wood tissue and consequently trunk breakage. Breaking of trees causes formation of gaps in the canopy, permitting penetration of wind which leads to further tree loss due to wind damage. Attempts to develop a disease control strategy by identifying effective fungicides and method of application have already been made (Idicula *et al.*, 1990). Methoxy ethyl mercuric chloride (MEMC) was identified as an effective fungicide and recommended. The Government of India has imposed strict restrictions in its use due to its high human toxicity (Jacob *et al.*, 1995). Asthiram (TMTD) is a contact fungicide currently recommended for the

control of dry rot disease in rubber. In the present study, the efficacy of six systemic fungicides for the control of the disease was evaluated in comparison with TMTD with a view to identify more effective and less hazardous alternatives.

### **MATERIALS AND METHODS**

An experiment was laid out in a high rainfall area (Thodupuzha) planted with the rubber cultivar, RRIM 600. Rubber trees were graded on the basis of severity of infection and extent of wood damage. There were three grades, i.e., 1) mild, 2) moderate and 3) severe. The wounds were thoroughly cleaned by chipping off the bark and discoloured wood tissues with a small axe from the lesion area. The latex was wiped off from the cut surface and the fungicide incorporated in rubberkote (a petroleum wound dressing compound) was applied using a brush to cover the entire cut surface. The treatments included were hexaconazole (0.02% a.i.), TMTD (0.75% a.i.), propiconazole (0.20% a.i.), validamycin (0.06% a.i.), myclobutanil (0.06%

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a.i.), tridemorph (1.00% a.i.) and penconazole (0.04% a.i.). Fungicides at specified doses were incorporated in the rubberkote prior to application and hand stirred with a rod.

The experiment was repeated for three consecutive seasons between 1995 and 1997. However, tridemorph and penconazole were included in the last two seasons only. During the third season, only moderate and severely infected trees were selected for imposing the treatments. Treatments were imposed during July/August and the trees were observed up to November/December for new infection at the treated loci. Arbitrary values (1, 2 and 3) were given to mild, moderate and severe grades. Product of percentage recovery and arbitrary values were added up for each treatment to obtain final score which was subjected to  $\chi^2$  test of goodness of fit.

## RESULTS AND DISCUSSION

The use of hexaconazole resulted in complete recovery of all treated trees followed by validamycin, an antibiotic while TMTD

Table 1. Recovery of rubber trees from dry rot disease

| Treatment (% ai)                 | Total score |      |       | Rank |
|----------------------------------|-------------|------|-------|------|
|                                  | 1995        | 1996 | 1997* |      |
| Hexaconazole<br>(Contaf, 0.02)   | 600         | 600  | 500   | 1    |
| TMTD<br>(Tiride, 0.75)           | 166         | 300  | 316   | 7    |
| Propiconazole<br>(Tilt, 0.20)    | 220         | 501  | 500   | 5    |
| Validamycin<br>(Validacin, 0.06) | 501         | 525  | 500   | 4    |
| Myclobutanil<br>(Systhane, 0.06) | 180         | 525  | 413   | 6    |
| Tridemorph<br>(Calixin, 1.00)    | -           | 600  | 500   | 2    |
| Penconazole<br>(Topas, 0.04)     | -           | 540  | 500   | 3    |
| $\chi^2$                         | **          | **   | **    | -    |

\* Maximum value for 1997 is 500 as mild stage was not included

recorded the least. Similar trend was observed in 1996 as well. Tridemorph was comparable to hexaconazole and was superior to validamycin. During 1997, hexaconazole, propiconazole, validamycin, tridemorph and penconazole were found to be on par with each other. Out of the six systemic fungicides tested, hexaconazole was consistently superior in controlling the disease (Table 1). Tridemorph was equally effective in the control of dry rot pathogen while TMTD exhibited poor performance during all the seasons, consistently. Triazole fungicides like hexaconazole inhibit ergosterol biosynthesis in the fungi (Vyas, 1993). They have very low mammalian toxicity. Triazoles are systemic in action while TMTD has only contact action.

Rubberkote used in the present study is an effective carrier for fungicides but water dispersible powder formulations like TMTD has been reported to be more effective when mixed with rubber kote using a mechanical stirrer (Edathil *et al.*, 1988). In the present study, the water dispersible formulation, TMTD and myclobutanil were found inferior to emulsifiable concentrates. Their low effectiveness may probably be due to the manual mixing. However, mechanical stirring is not practical as such facilities are not available in rubber holdings. Often fungicides are to be mixed in the field itself and manual mixing is only possible. Better dispersion of the EC formulations in the carrier could be one of reasons for their higher effectiveness. Considering the efficacy and the cost, hexaconazole (0.02% a.i.) can be effectively used for the control of dry rot disease in *Hevea*.

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