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Evaluation of Endophytic *Trichoderma* and Other Microbes for Potential Biocontrol of *Ganoderma* Basal Stem Rot Disease on Oil Palm Seedlings

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To minimise infection risk and impact of basal stem rot (BSR) disease on its new second generation oil palm replants, Asian Agri has adopted a four stage integrated disease management (IDM) strategy of which, protection of newly planted oil palm seedlings with an effective biocontrol agent is an important component. At its R & D Centre, evaluation of soil microbes is being carried out in three phases. Potential microbes from in vitro laboratory screenings (phase 1) are further tested in the nursery (phase 2) with final validation of successful candidates in field trials (phase 3).

This paper reports on the results of eight nursery trials which evaluated a total of 42 in-house Endophytic Trichoderma (ET) isolates and 13 commercial bioagent products for their effectiveness in controlling the BSR pathogen, Ganoderma boninense.

All 42 ET isolates conferred some degree of protection to the oil palm seedlings against Ganoderma infection, when compared to the unprotected control seedlings. Nevertheless, there were significant differences in the efficacy of the 42 ET isolates. Ten ET isolates averaged below 25 per cent disease incidence (DI) of which, ET 501 was the most effective and most consistent in performance. ET 501 recorded a low average DI of only 14 per cent as compared to 81 per cent in the control seedlings. Its consistency in performance was reflected in all eight trials with a narrow DI range of 6 - 20 per cent as compared to a DI of 73 - 88 per cent in the control seedlings. The high DI range in the control seedlings in all eight trials also confirmed the aggressive pathogenicity of the Ganoderma isolate used for screening. The latter is critical, as low values could lead to wrong interpretation and analysis of the performance of the products being tested.

Of the 13 commercial products evaluated, all conferred some degree of protection to the inoculated seedlings, although only five products recorded average DI levels below 50 per cent (range: 21 - 43 per cent). However, none of the 13 commercial products were as effective as Asian Agri's ET 501 isolate, which consistently recorded the lowest DI values in these comparative screening trials.

Laboratory and nursery screening is invaluable, as they help to identify and shortlist potential candidates for final evaluation in the field. Direct screening in the field would be costly and time consuming, in view of the large number of isolates and products to be tested. However, field validation is vital as soil chemistry, climate and microbial populations in the rhizosphere may differ between nursery and field, hence affecting the efficacy of the applied bioagents. In view of this, the most promising ET isolates are being further tested in field trials on both mineral and peat soils, to confirm their effectiveness prior to commercial use.

Keywords: Basal stem rot, Endophytic Trichoderma, Ganoderma boninense, oil palm seedlings.

