Control of bud rot in oil palm, *Elaeis guineensis*, using resistance inducers

E. Alvarez[1], G.A. Llano[1], M.C. Feris[2], M.L. Hernández[2] and S.M. Rodríguez[3]

[1]International Center for Tropical Agriculture, CIAT, A.A. 6713 Cali, Colombia. [2]Palmas de Casanare, Villanueva, Colombia. [3] Unipalma, Villavicencio, Colombia.

INTRODUCTION

Bud rot has become the main problem affecting the oil palm in Latin America. This disease causes high economic losses because the palms suspend raceme production from 12 to 24 months. The average weight of the racemes also decreases as well as the oil extraction rate. Bud rot causes yellowing of young leaves and rotting of spear and crown leaves. In general, the racemes are not affected. Bud rot occurs in all plantations regardless of crop age.

MATERIALS AND METHODS

Phosphoric acid 25% and 40%, and potassium phosphonate product, NF (phosphorous acid: 434 g/L P_20_5, potassium hydroxide and potassium citrate: 403 g/L K_2O), were used as disease resistance inducers. Every 30 days, healthy palms and those moderately affected (2 to 3 according to scale) were treated by trunk injection below the merisyem and root absorption. Each month, during 13 months, evaluations were made using a scale from 1 to 4, where 1 represents asymptomatic plants, and 4, plants with all spears rotted, general yellowing in the crown and shortening of leaves. With NF, 38% disease reduction was obtained by means of injection to the trunk and 44% reduction by root absorption.

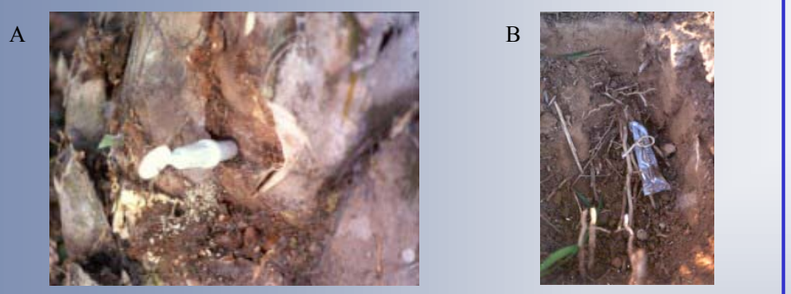

Figure 1. Healthy and affected palms were treated by trunk injection (A) and root absorption (B), with two resistance inducers.

RESULTS

Applications of NF or 40% phosphoric acid, maintained the initially healthy palms with a low disease severity (1.1 to 1.6 according to scale). With the application of 40% phosphoric acid, through root absorption, the production of racemes was increased by 37% in healthy plants and by 23% in diseased plants, although it was not as effective as NF in control of the disease. There were no significant differences between injection to the trunk and root absorption. It was concluded that bud rot could be controlled using inductors of resistance based on potassium and phosphorus, as part of the integrated management of the disease.

Figure 2. Application of potassium phosphonate (NF) decreased disease severity.

Figure 3. Affected palm with application of water, as control.

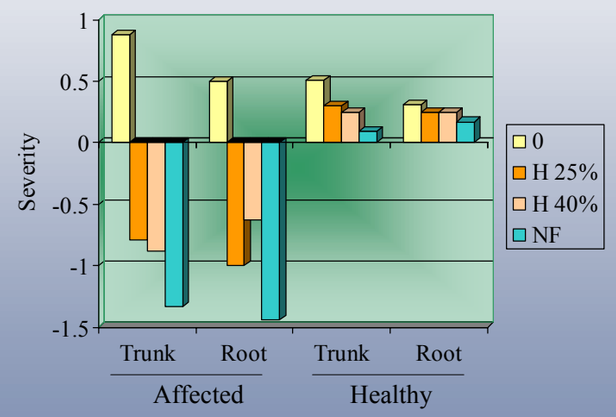

Figure 4. Advance of bud rot in healthy and diseased oil palms treated with resistance inducers by two methods.

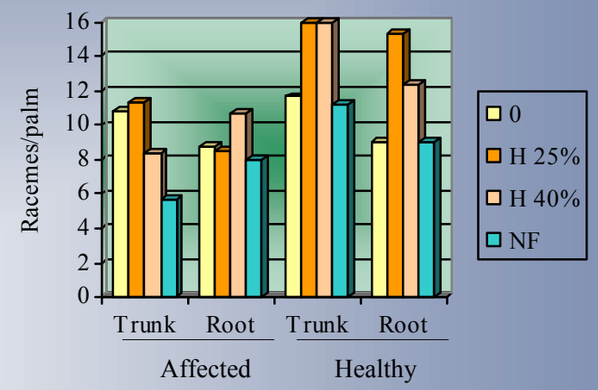

Figure 5. Racemes produced over a 13-month period by healthy and diseased palms treated with resistance inducers.

CONCLUSIONS

No differences were observed in disease control nor in raceme production between treatments when resistance inducers were directly applied to the trunk or by root absorption.

The best treatments to control bud rot were 25% phosphoric acid and NF.

Bud Rot can be managed with resistance inducers as a component of integrated disease management.

Raceme production increased with the application of phosphoric acid, mainly in healthy palms.

REFERENCES

Greenhalgh, F.C., de Boer, R.F., Merriman, P.R., Hepworth, G. and Keane, P.J. 1994. Control of *Phytophthora* root rot of irrigated subterranean clover with potassium phosphonate in Victoria, Australia. Plant Pathol. 43: 1009-1019.

Guest, D.I.. and Grant, B.R.. 1991. The complex action of phosphonates as antifungal agents. Biol. Rev. 66: 159-187.

Smillie, R., Grant, B.R. and Guest, D. 1989. The mode of action of phosphite: evidence for both direct and indirect modes of action on three *Phytophthora* spp. in plants. Phytopathology 79: 921-926.