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Inventory of ant species associated with mealybugs, vectors of cocoa swollen shoot virus at the CNRA-Divo research station, Côte d'Ivoire

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INTRODUCTION

Swollen shoot is a serious disease of cocoa trees in Côte d'Ivoire. It is caused by a complex of Badnaviruses and is transmitted by mealybugs. The control of these mealybugs is difficult because they are protected by earthen shelters built by ants. In return, the mealybugs provide them with honeydew. In order to effectively control CSSV mealybugs, it is important to identify the species of ants associated with cocoa mealybugs. Thus, an inventory of ant species present on cocoa trees was carried out in cocoa farms at the CNRA research station in Divo.



MATERIAL AND METHODS

Four (4) blocks of cocoa trees of different characteristics were chosen (cocoa trees close to forests, surrounded by coffee plantations, young cocoa trees, adult cocoa trees with the presence or not of pods, etc.). In each block, four (4) sub-blocks composed of 3 lines of 17 cocoa trees were randomly selected (Fig. 1). The ants were collected from all the trees in these sub-blocks and then preserved in Eppendorfs tubes containing 70% alcohol (Fig. 2). These specimens were identified with a binocular magnifying glass with a magnification of 10 to 60 X, based on the body parts (Fig. 3). The abundance of ants as well as the mealybug species with which they were associated were also determined after counting the colonies.



Fig 1. Delimitation of sub-plot



Fig 2. Collection of ants

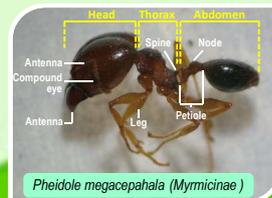


Fig 3. Identification of ant species

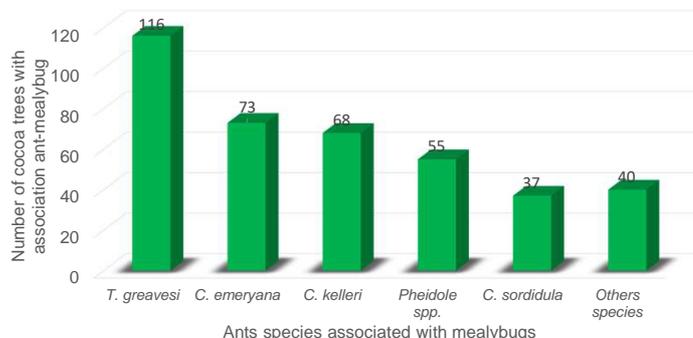


Fig 5. Level of association of ants with mealybugs

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RESULTS

As results 29 species of ants divided into five (5) subfamilies (Dolichoderinae, Dorylinae, Formicinae, Myrmicinae and Ponerinae) were identified (Fig 4). The ant species identified, *Teratomyrmex greavesi* was the most abundant (31.86%), followed by *Oecophylla longinoda* (21.32%) and *Crematogaster kelleri* (20.96%). Sixteen (16) ant species were associated to mealybugs, among them, *Teratomyrmex greavesi* (28.29%), *Crematogaster emeryana* (17.80%), *Crematogaster kelleri* (16.59%) and *Pheidole* spp (13.41%). In addition, six (6) species of mealybugs were also identified. Among them, *Formicococcus njalensis* (63.17%) and *Planococcus citri* (31.21%) were the most associated with ants.

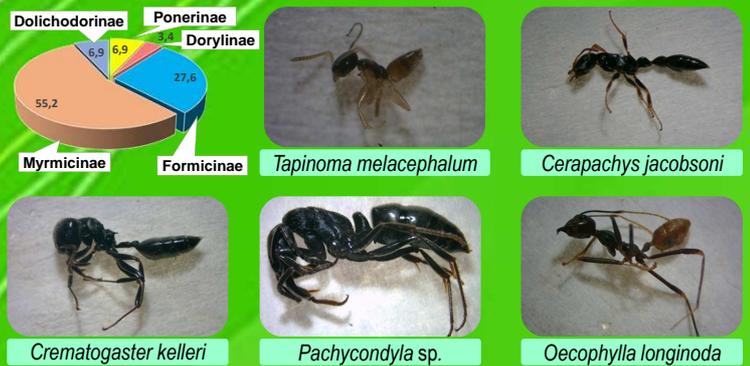


Fig 4. Proportion of ant subfamilies identified and one representative species per subfamily

CONCLUSION AND PERSPECTIVES

- 29 ant species from 5 subfamilies were identified ;
- 16 ant species were associated to mealybugs including *Teratomyrmex greavesi*, *Crematogaster* spp. and *Pheidole* spp.;
- Main mealybug species associated to ants were *F. njalensis* and *P. citri*;
- Interaction ant-mealybugs have to be studied and included in the global strategies to control swollen shoot disease.