PRELIMINARY RESULTS ON COMPARATIVE GC ANALYSES OF VOLATILES PRODUCED BY THE COFFEE BERRIES

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Recent evidence for allelochemical relationships between the coffee borer : *Hypothenemus hampei* (Ferr.) and the coffee : *Coffea sp.* (Giordanengo et al., in press) led us to investigate by chemical analyses (GC, GCMS) the volatiles produced by Robusta coffee berries.

GC analyses of either pentanic or acetonic washes of green and red coffee berries showed quantitative differences in resolved peaks. These solvents were choosen to extract repectively aliphatic and cyclic hydrocarbons for the pentane and alcohols, aldehydes and acids for acetone.

Pentanic washes contained more volatile compounds than acetonic washes; however, differences between washes of fresh green berries and fresh red berries.were more noticeable with acetonic washes. Fresh red berry have been found by biological tests to be more attractive than fresh green berry and thus the differences observed in the chemical composition of the washes could account for the preferential selection of the red berry by the scolytes. All these compounds are now being identified using GC-MS and structures such as sesquiterpenes, acids, aldehydes, and esters have been determined.

Further behavioural tests will be conducted to determine whether all the differences shown by GC have biological significance.

The Identification of volatile attractants could aid in the management of the coffee berry borer by providing lures for traps which could be used to monitor pest populations.

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INTRODUCTION

Recent studies on the coffee berry borer have provided evidence that female borers use volatile chemicals from the host to locate feeding and oviposition sites. Pentane and acetone extracts of mature and immature berries were tested for biological activity and then were analysed using GC and GC-MS.

MATERIAL AND METHODS

- Volatile extractions

Either red or mature green berries were extracted within 2 or 4 hours after field collection. Solvents used were pentane or acetone. Twenty berries were individualy washed in 1 ml of solvent during 30 s. A nitrogen airstream was used to condense to 100 μl the resulting extract and to reduce further oxidation. Analyses of red berry extracts with either pentane or acetone and of green berry extracts in acetone were then performed without any purification.

- Analyses

GC analyses were performed on a Girdel 30 equipped with a non polar column : Fused silica CPSil 8CB, 25m., 0.32 id (Chrompack, The Netherlands). Temperature of the oven was programmed from 40°C to 60°C at the rate of 20°C per min. followed by a step of 4 min. at 60°C and then 60°C to 280°C at the rate of 8°C per min. Injector was used in splitless mode (25 s., 190°C). The GC apparatus is linked to a Ribermag R10-10C mass spectrometer used in electronic impact (70 EV, 30-500 m.a.u.).One μl of each extracts was injected for analyses.

RESULTS

Results account for a putative specifity of peaks 37 and 39 in red berries. These compounds have now to be tested as candidate attractants towards the coffee berry borer females as well as compounds 68, 69, 72, 73. Chemical structures of most of these compounds were identified or tentative identifications have been undertaken but regarding the lack of behavioural signification, the structures will not be given in this poster.Comparison of Fig. a and Fig. b showed that pentanic extracts were more complex than acetonic extracts, especially concerning low molecular weight compounds. Acetonic extracts of green berries (Fig. c) were very different from acetonic extracts of red berries.

CONCLUSION

Further behavioural tests will be conducted to determine whether all the differences shown by GC have biological significancThe Identification of volatile attractants could aid in the management of the coffee berry borer by providing lures for traps which could be used to monitor pest populations.

REFERENCES :

Giordanengo, P., Brun, L.O., Frérot, B. First evidence for allelochemichal relation between the coffee berry borer and its host plant. J. Chem. Ecol. (submitted).

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