Doctoral Thesis

Sinnesphysiologische Untersuchungen über die Pheromonperzeption von Scolytus-Arten, besonders Scolytus multistriatus
Feldversuche, Elektroantennogramme und Einzelzellableitungen von den Antennen

Author[s]:
Angst, Max E.

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ABHANDLUNG
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MAX E. ANGST
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Prof. Dr. G. Benz, Referent
Prof. Dr. K. Bättig, Korreferent
Abstract

Recordings from single olfactory receptor cells in *Scolytus multistriatus* demonstrated two types of receptor cells, each specialized to one of the pheromones of this species, (-)-α-multistriatin and (-)-threo-4-methyl-3-heptanol.

In cells most sensitive to (-)-α-multistriatin, the (+)-α-enantiomer was about ten times less effective. This same difference in sensitivity could be found in EAG's, indicating that all receptor cells responding to multistriatin are specialized to the (-)-α-enantiomer. δ-multistriatin, brevicomin and frontalin showed an effect on this cell type too. The differences in sensitivity of these compounds in electrophysiological recordings correspond very well with their attractiveness in the field, with the exception of frontalin. The reaction to δ-multistriatin and brevicomin is probably based on impurities with α-multistriatin.

(-)-α-multistriatin cells did not show an effect to stimulations with high concentrations of α-cubebene, 4-methyl-3-heptanol, terpineol and limonene.

Field as well as laboratory bioassays and EAG's showed no difference in response to α- and δ-multistriatin between an american and a swiss population of *Scolytus multistriatus*. Both responded better to the α-isomer.

Cells specialized to (-)-threo-4-methyl-3-heptanol responded with a 100 times smaller effect to the other enantiomers. EAG's showing the same difference in sensitivity suggest that in *S. multistriatus* (-)-threo-4-methyl-3-heptanol cells are present only. High concentrations of multistriatin, α-cubebene, terpineol and limonene did not stimulate this cell type.
Another cell type responded to various compounds, but at extremely high concentrations only, indicating that the key compound was not available.