Studies of the chemical communication system of *Sesamia nonagrioides* in three geographic populations

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Abstract: The corn stalk borer *Sesamia nonagrioides* (Lef.) (Lepidoptera: Noctuidae) is considered as the most serious corn pest in many Mediterranean countries. Control measures used by the farmers to reduce the insect population are cultural, such as stalk destruction after harvest to reduce survival of diapausing larvae and use of resistant corn hybrids. Chemical control is effective to first stage larvae when they feed on the stem before boring into it.

The sex pheromone of *S. nonagrioides* has been identified as mixture of (*Z*)-11-hexadecenyl acetate [(*Z*)11-16:Ac], (**1**) and (*Z*)-11-hexadecenol [(*Z*)11-16:OH], (**2**)[1] (*Z*)-11-hexadecenal [(*Z*)11-16:Ald] (**3**) and dodecyl acetate (12:Ac) (**4**)[2] Field trials conducted in France and Spain with pheromone traps to monitor moth populations indicated that traps baited with the four-component blend **1-4** in 69:8:8:15 ratio were less attractive than traps baited with virgin females[3,4]. An improved formulation concerning male attractiveness and selectivity was developed as a mixture of **1+2+3+4** in 77:8:10:5 ratio based in wind tunnel and field tests in Spain[5]. However, the new formulation was again less effective than virgin females in field tests carried out in southern France[3]

We present comparative studies aiming at determining (a) possible differences in the sex pheromone communication system of three *S. nonagrioides* populations (French, Spanish and Greek), (b) male response of the three populations both to natural and synthetic pheromone in wind tunnel and field tests.
GC-MS studies: The pheromone components (*Z*)-11-hexadecenyl acetate [(*Z*)11-16:Ac] and (*Z*)-11-hexadecenol [(*Z*)11-16:OH],and dodecyl acetate (12:AC) were detected with very small differences in the three populations. Among the minor components, (*Z*)-11-hexadecenal [(*Z*) 11-16:Ald] was detected in very minor amounts on concentrated gland extracts from French and Greek origin females, and after treatment of the pheromone gland with PBAN on the Spanish population.
Behavior studies: Wind tunnel studies revealed similar male response of the three populations to excised pheromone glands and gland extracts, regardless of the females/males origin, as well as to synthetic pheromone.
Field studies: In field tests conducted in the three countries, male responses were similar to two different pheromone blends: 69:8:8:15 (A) and 77:8:10:5 (B) of **1+2+3+4**.
Conclusion: The results obtained do not support the assumption of the existence of different pheromone types of the *S. nonagrioides* due to geographic isolation.

Citations
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