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Candidate Sex Pheromones of the New World Screwworm *Cochliomyia Hominivorax* -- Summary & Abstract

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Interpretive Summary: Females in established colonies of screwworm flies eventually lose the ability to make sex stimulant pheromone. This fact could result in the poor mating success observed during large sterile insect technique projects, such as the current Screwworm eradication program in Jamaica. Scientists at the Center for Medical, Agricultural and Veterinary Entomology in Gainesville, Florida were sought out by the International Atomic Energy Agency to test for and identify the sex pheromone in colonized Screwworm flies. Six chemical structures from previously published works were selected and all five new compounds were synthesized. Tests were conducted on colony screwworm flies from USDA, ARS, Midwest Livestock Insects Research Unit in Lincoln NE and from Tuxtla Gutierrez, Mexico. Two of the five compounds resulted in strong sexual stimulation when tested with males of three new strains, but the 1992 strain and the sterile males responded poorly. This work completes the identification and synthesis of the biologically active compounds in screwworms originally started by ARS many years ago. This synthetic sex pheromone could be used as a standard to test the responses of colonized males, the result of an effort to transfer technology from the laboratory to solve practical problems in the field.

Technical Abstract: Multinational programs to eradicate the New World Screwworm (*Cochliomyia hominivorax*) using the sterile insect technique were successful in Libya, North and Central America, and other programs are contemplated in the Caribbean and South America. Operational difficulties may occur in large-scale efforts particularly through the deleterious effects of rearing bottlenecks on factory flies. Long-term rearing may affect the sexual competence of sterilized factory flies, as rearing appears to result in the decline of sex pheromone. Its loss from females could seriously affect programs by contributing to mating incompatibility between sterile and wild flies. Previously, the natural sex pheromone was never fully characterized by ARS scientists. Five novel chemical structures were selected from published data and synthesized. Tests were conducted on colony screwworms in Lincoln, NE and Tuxtla, Mexico. Potent stimulatory activity was found in activity of two compounds when tested with males of 3 colonized strains, but an older 1992 strain and sterile males responded poorly.