FAO/IAEA Int. Conf. on Area-Wide
Control of Insect Pests,
Penang, May 28 to June 2, 1998

D-20

THE USE OF GAMMA RADIATIONS AS A CONTROL METHOD AGAINST THREE SELECTED SPECIES OF LEPIDOPTERA

Valter Arthur[1], Frederico Maximiliano Wiendl[2], Jose Tadeu de Faria[2],Toni Andreas Wiendl[3], Jose Alfredo Duarte Aguilar[1]

[1]Nuclear Energy Center for Agriculture: CENA/ USP - Piracicaba, SP - Brazil

[2] Ministry of Agriculture and Supplies: DDIV/ SAA/ MAA - Brasilia, DF - Brazil

[3]Center for Biotechnology in Agriculture: CEBTEC/ ESALQ/ USP - Piracicaba, SP - Brazil

The present paper includes research on the application of nuclear techniques to control three of the most important Lepidopteran insects pests in Brazil.Undoubtedly sugar cane is at this time the most important crop in the country, not only for sugar production but also for pure alcohol for cars and it is always mixed with the common gasoline at percentages up to 24%. This turns the country less dependent from other fuel sources and tops also the ideal of any fuel: alcohol is much less polluting than all other petroleum products. The sugar cane borer *Diatraea saccharalis,* the most important pest in sugar cane, is also one of the most important pests in brazilian agriculture. To introduce sterility in the F-1 Generation, pupae were irradiated at the age of five days after pupation. Irradiation with doses of 100 and 150 Gy at a dose rate of 3.0 kGy per hour resulted into 15% viable eggs using 100 Gy and no viable eggs with 150Gy. The fertility in the F-1 Generation decreased down to 4.3% and 10.9% and in the F-2 Generation to 9.5% and 25.5% by crossing treated males with normal females and treated females with normal males, respectively.

Another important field pest is *Spodoptera frugiperda.* The insect causes losses of around 35% on maize, sorghum, rice and wheat. Five day old pupae were irradiated with 50, 100, 125, 150 and 175 Gy, at a dose rate of 2.15 Gy per hour. Adults of the F-1 and F-2 Generations were obtained if the Parents were irradiated with the dose of 50Gy. If they were irradiated with higher doses, only the crossing of irradiated males with non-irradiated females obtained adults of the F-1 and F-2 Generations. Females are more radiosensitive than males, and substerilizing gamma radiation doses did not affect the life cycle of the first and second generations. The sterility level in these both generations was higher than the sterility of the parents.

Rice is in Brazil perhaps the most important food for its population and *Corcyra cephalonica* is a severe pest..The present studies indicate that the sterilizing dose for pupae of this species was around 350 Gy. For the F-1 Generation, the sterilization was induced onto their Parents with the dose of 150 Gy. Irradiated adults did not become sterile with doses of up to 400 Gy, but their descendants of the F-1 Generation became complete sterile if their parents were irradiated with the dose of 100 Gy.