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Cryopreservation of New World Screwworm Embryos

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Title: Cryopreservation of New World Screwworm Embryos

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Interpretive Summary: The following interpretive summary refers to an oral presentation given at the 2002 Annual Meeting of the Livestock Insect's Workers Conference. The New World screwworm, *Cochliomyia hominivorax* (Coquerel) has been successfully eradicated from the United States, Mexico and Central America. The program involves monitoring infestations and the mass rearing and release of sterile screwworms. In order for the program to be successful, research must be conducted to make the identification and rearing of the insect more efficient. Methods have been developed to distinguish the screwworm from other fly larvae that may be found in animal wounds using Polymerase Chain Reaction (PCR) and Enzyme Linked Immunoassay (ELISA) techniques. The development of a genetic sexing strain would help to reduce the number of insects reared at the mass rearing facility. In order to conduct such research, numerous strains with identifiable genetic markers must be maintained in the laboratory. A cryopreservation technique would allow our laboratory to reduce the number of strains that are actively being maintained. This would allow more space and labor to be devoted to research. The procedure could also aid in reducing the frequency in which new production strains need to be established. It may be an important tool in investigating strain deterioration in the mass rearing process. A method for cryopreserving screwworm embryos has been developed. This procedure allowed an average of 52.5% of the eggs to hatch. About 22% of the larvae survived to pupation. The developmental time was greater for individuals from frozen embryos and the resulting pupae were smaller. A colony with normal developmental characteristics was re-established within two generations. Additional research is required to determine the effects of cryopreservation on other strains of New World screwworm.

Technical Abstract: The following technical abstract refers to an oral presentation given at the 2002 Annual Meeting of the Livestock Insect's Workers Conference. The New World screwworm, *Cochliomyia hominivorax* (Coquerel) has been successfully eradicated from the United States, Mexico and Central America. The program involves monitoring infestations and the mass rearing and release of sterile screwworms. In order for the program to be successful, research must be conducted to make the identification and rearing of the insect more efficient. Methods have been developed to distinguish the screwworm from other fly larvae that may be found in animal wounds using Polymerase Chain Reaction (PCR) and Enzyme Linked Immunoassay (ELISA) techniques. The development of a genetic sexing strain would help to reduce the number of insects reared at the mass rearing facility. In order to conduct such research, numerous strains with identifiable genetic markers must be maintained in the laboratory. A cryopreservation technique would allow our laboratory to reduce the number of strains that are actively being maintained. This would allow more space and labor to be devoted to research. The procedure could also aid in reducing the frequency in which new production strains need to be established. It may be an important tool in investigating strain deterioration in the mass rearing process. A method for cryopreserving screwworm embryos has been developed. This procedure allowed an average of 52.5% of the eggs to hatch. About 22% of the larvae survived to pupation. The developmental time was greater for individuals from frozen embryos and the resulting pupae were smaller. A colony with normal developmental characteristics was re-established within two generations. Additional research is required to determine the effects of cryopreservation on other strains of New World screwworm.