PROCESS OF REVISING THE FAO/IAEA/USDA MANUAL FOR PRODUCT QUALITY CONTROL & SHIPPING PROCEDURES FOR STERILE MASS-REARED TEPHRITID FRUIT FLIES

Patrick Gomes[1], Jorge Hendrichs[2], Rui Pereira[2], Andrew Parker[2]
([1]USDA-APHIS-PPQ, Raleigh, North Carolina, USA; [2]Joint FAO/IAEA Division, Vienna International Centre, Vienna, Austria)

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Why test insect quality?

- Considerable investment involved
  - Constructing & maintaining facilities
  - Production, sterilization, packaging, shipping, receiving, emerging and release
- Cost of ineffective pest control
  - Direct crop loss
  - Higher program costs
  - Could result in greater pesticide use to reduce pest population
- Bolsters confidence by producers, investors and clients that sterile insects will perform in expected manner

Brief History of QC Testing

- 1950's – 1960's
  - FAO/IAEA sponsored projects & coordinated research projects
  - Focus on mass-rearing, sterilization and demonstration of technology
- 1970's
  - Increasing evidence that many factors affect insect quality and performance
  - Large emergency programs place greater demands upon production

Brief History of QC Testing (cont.)

- 1972 Boller E "Behavioral aspects of mass-reared insects"
- 1975 Chambers DL "Quality in Mass-Produced Insects: Definition & evaluation"
- 1977 Boller E, Chambers DL (eds) Quality control: an idea book for fruit fly workers - IOBC Bulletin SROP-WPRS 1977/5

Brief History of QC Testing (cont.)

- 1983 Orozco-Davila D et al. Manual de Procedimientos de Control de Calidad (utilizado para evaluar la mosca producida en el Laboratorio de Produccion y Esterilizacion de Mosca del Mediterraneo
- 1984 Ashley T et al. – Developed QC manual for use by Programa Moscamed at San Miguel Petapa
- 1986 Brazzel JR et al. Required quality control tests, quality specifications, and shipping procedures for laboratory produced Mediterranean fruit flies for sterile insect control programs. APHIS 81-51, USDA-APHIS

FAO/IAEA/USDA Manual

- 1997-98 Consensus reached among19 experts to harmonize fruit fly product quality control "Product Quality Control, Irradiation and Shipping Procedures for Mass-Reared Tephritid Fruit Flies for Sterile Insect Release Programmes" (Version 4).
- This manual is recognised as an International guideline for fruit fly SIT projects
- Commitment by all parties to implement
- Revisions made to the manual in 2003

Process for Revision

- Consultants meet to review each test, assemble data from recently published research findings, evaluate the need to change, remove or add tests and arrive at consensus on all changes to the manual
- Coordinated Research Projects sponsored by the Joint FAO/IAEA play a key role in examining new & better ways to assess insect quality
- International symposia, conferences & workshops serve as an important forum to report new findings and identify research gaps that need to be addressed

International Consensus

- Major rearing facilities and programs are represented
- Broad participation
- Manual reviewed and comments solicited prior to and after Consultant's meeting

Reasons to Revise Manual

- New scientific findings become available that are applicable to assessing insect quality
- Updating minimum standards of performance especially for new strains
- Production facilities and programme staff develop new & better tools for assessing quality that warrant consideration
- Updated manuals on post factory QC by programmes
- Critical examination of utility and meaning of existing tests

What tests are performed?

- Required Routine Tests (each batch/weekly)
- Required Periodic Tests (monthly/annually)
- Ancillary Tests (as determined by programme)

Required Routine Tests

- Pupal weight
- Emergence & flight ability
- Survival under stress
- Sex ratio & timing of emergence
- Sterility
- Absolute fliers
- Survival Chilled/Released flies under stress

Required Periodic Tests

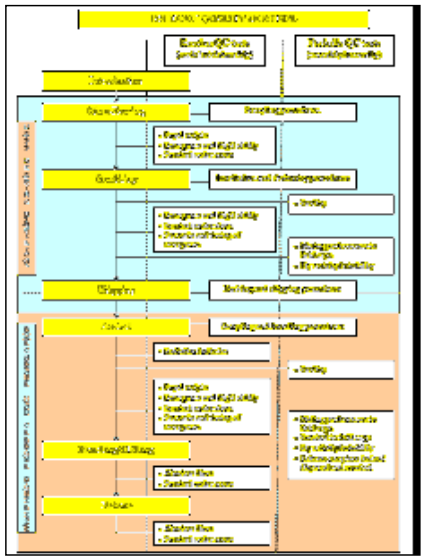
- Sterility
- Mating performance in field cage
- Fly activity/Irritability
- Survival in field cages
- Release-Recapture Tests of Dispersal & Survival

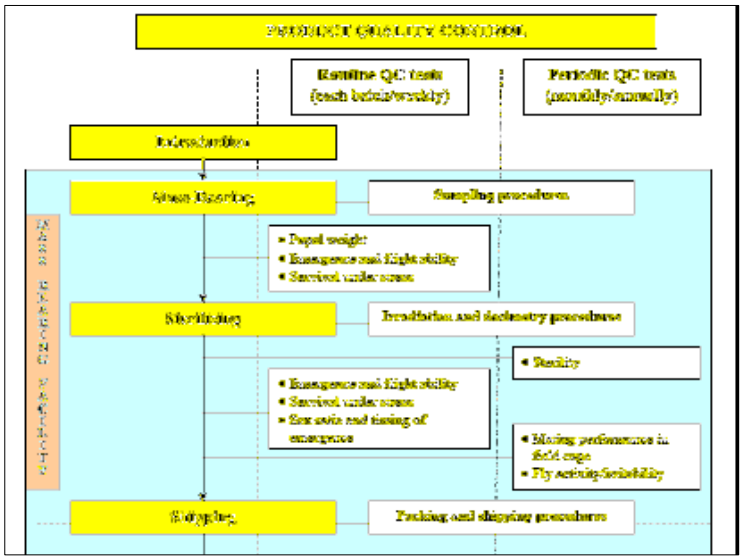
Ancillary Tests

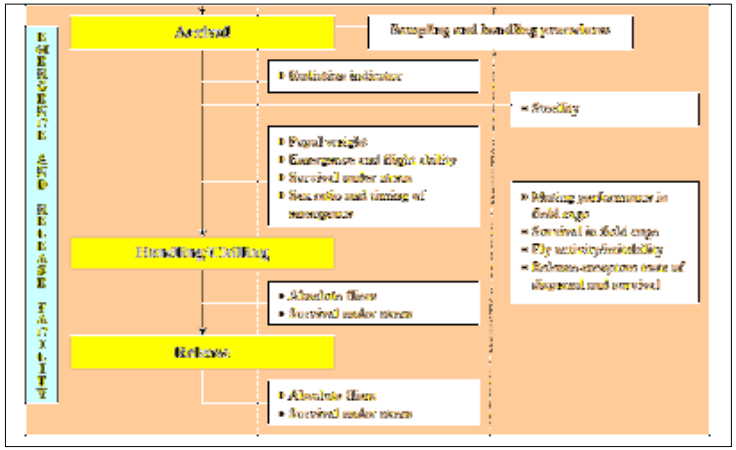
- The "Fried" Test
- Pheromone Compatibility Test
- ***New!*** Capacity to React to Adverse Stimulus/i Test
- ***New!*** Open field "Fried" Test
- ~~Laboratory Mating Test~~ **(Discontinued)**

Who does the testing & when?

- Mass-Rearing Facility
  - Quality Control Unit
- Emergence & Release Facility
  - Quality Control Unit
- Field Programme Staff







Flowchart underscores the value of having a standard set of procedures for each test so that results can be compared.

General Layout for Each Test

- Title of Test
- Objective
- Description
- Interpretation
- Equipment & Supplies (where applicable)
- Procedures
- Relevant Literature

Other Features

- Sampling & Handling Procedures (Process Control)
- Irradiation Procedures (Process Control)
- Dosimetry Procedures (Process Control)
- Shipping Procedures (Process Control)
- Forms for recording quality control data
- Chronology of Product Quality Control of Tephritid Flies for Use in SIT Programmes
- Known Sources of Key Equipment & Supplies
- Terminology
- History of Transboundary Shipment of Sterile Tephritid Fruit Flies
- Transboundary Shipment of Sterile Insects

Important Websites Pertaining to Tephritid Quality Control

FAO/IAEA/USDA Product Quality Control Manual

http://www-naweb.iaea.org/nafa/ipc/public/manuals-ipc.html

Coordinated Research Projects

Active CRPs

http://www-naweb.iaea.org/nafa/ipc/crp/active-crps-ipc.html

Completed CRPs

http://www-naweb.iaea.org/nafa/ipc/crp/completed-crps-ipc.html

Scientific Papers

http://www-naweb.iaea.org/nafa/ipc/public/scientific-papers-ipc.html

Thank you for your kind attention!

Any Questions?