

Management Recommendations for
African Invader Fruit Fly (*Bactrocera
Invadens*) in Manica Province,
Mozambique

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Management recommendations:

1. Sanitation is key
 - a. Remove and destroy all potential host material in and around production areas
 - i. other area as well, i.e., markets, homes
2. Biological control (projects underway with ICIPE)
 - a. Soil fungi that attack pupa
 - b. Parasitoid wasps
3. Chemical control
 - a. Tree base applications of residual insecticides (Thiamethoxam, etc)
 - b. Foliar/bait applications when fruit is susceptible to attack or fly populations are greater than 1 fly per day in local traps
 - i. Spinosad, neonicotinoids, pyrethroids, malathion, etc. with or without bait
 - ii. Need to assess impact*
 1. Beneficial insects, re-infestation, residues, etc.
 - iii. Practice good insect resistance management
 1. Do not use one insecticide mode of action (MOA) repeatedly and/or exclusively
 2. Rotate MOA's
 3. Use Integrated Pest Management
 - a. other control methods, scouting/trapping for pest presence
4. Bait stations/traps
 - a. Protein or pheromone attractants mixed with insecticides (Splat Mat, others)
 - b. There is a lot of opportunity in this area!
 - i. Example: The insecticide for a bait station developed by Syngenta is effective for an entire year (currently used in Spain)
 1. Males are attracted by methyl eugenol and dosed with a growth regulating insecticide. Once they mate, their offspring are unfit for survival
 - c. IMPORTANT: Need to assess best use practices!
 - i. Are the attractants lasting longer than the insecticides?
 - ii. How long are the attractants and /or insecticides active when used in bait mixtures?
 1. GF-120 misuse is a waste of time and money...also poor resistance management!

5. Determine when host fruits are susceptible to attack
 - a. Are immature mango, banana, avocado hosts?
 - i. Banana work is underway at ICIPE
 - ii. Anecdotal evidence suggests that immature mango is an unlikely host
 - b. At what point do they become susceptible?
 - c. Develop management guidelines according to fruit maturity
6. Assess effectiveness of alternative applications
 - a. Kaolin clay
 - b. Neem oil, other “organic” materials
7. Development of a packing protocol
 - a. Recording orchard trap counts before/at harvest, fruit maturity, inspecting fruit for damage, etc.
 - b. Protocols exist from United States Department of Agriculture (USDA) for fruit sent to mainland USA from Hawaii
8. Investigate post-harvest treatments
 - a. Temperature or chemical treatments
 - i. Both are well documented in literature
9. Find/develop novel markets for fruits considered infested
 - a. Dried mango, banana
 - b. Juice
10. Provide IPM and Best Management training to producers
 - a. What they don’t know can really hurt them!
11. Collaboration is needed across production areas, provinces and countries
 - a. Pool resources, knowledge, best practices, etc
 - i. Since I have been here I have never heard something like “They are trying this over there and it appears to be working.”
 - b. This is not just a local problem
12. Monitor and control BI in non-crop areas of potential infestation: Markets, etc.

Other suggestions:

1. Use other well studied fruit fly species as models for management (*Bactrocera dorsalis*, etc)