San Joaquin Valley Agricultural Sciences Center

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A Summary of the Current Status of Methyl Bromide Alternatives in Post-Harvest Pest Control

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Postharvest Alternatives Research

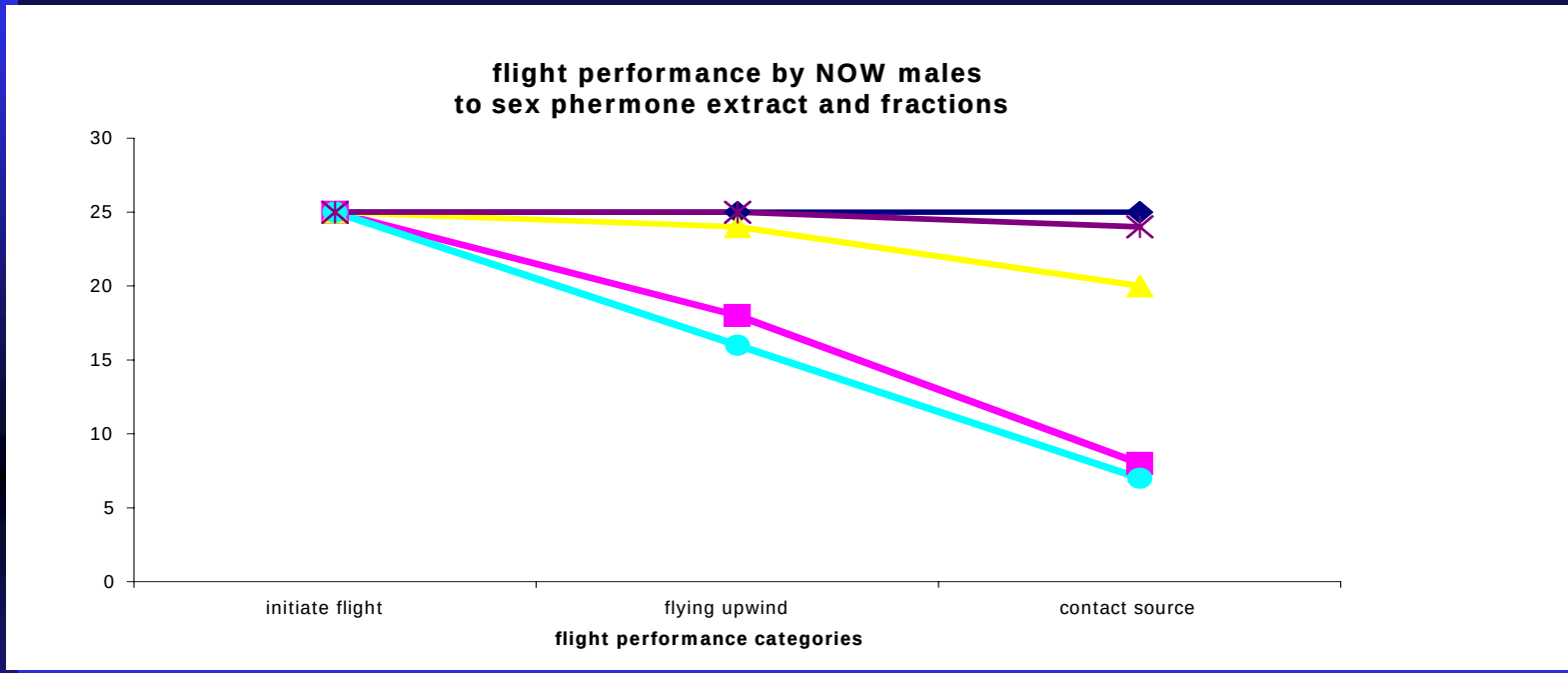
- **Chemically-Based Alternatives**
  - **New Fumigants**
  - **Volatile Identification/Mating Disruption**
  - **Controlled Atmospheres**
  - **Emissions Control**
- **Non-Chemical/Physical Alternatives**
  - **Radiation**
  - **Heat/Cold**
  - **Physical Control – Compression/Vacuum**
  - **RF Energy**

Chemically-Based Alternatives

New Fumigant Alternatives

- **Newly Developed Fumigants**
  - **COS – Carbonyl Sulfide**
  - **CH_3I – Methyl Iodide**
  - **C_2N_2 – Cyanogen**
  - **O_3 – Ozone**
- **Modified Existing Fumigants**
  - **PH_3 – ECO_2FUME®**
  - **SO_2F_2 – Profume®**
  - **C_2H_5COOH – Ethyl Formate**
  - **C_3H_6O – Propylene Oxide**

Volatiles and Mating Disruption



insect release platform

SIDE VIEW

chemical dispenser platform

Methyl Bromide Recapture

Non-Chemical/Physical Alternatives

RF Energy - Codling Moth

Navel orangeworm larva killed by entomopathogenic nematodes

Health Issues Research:

- **Studies on Carcinogenicity/Teratogenicity**
  - **More studies in future on both chronic and acute**
  - **Worker exposure – reduced TLV and PEL limits**
- **Residues on commodities and their dissipation/conversion**
- **Detection devices (residues and gas)**
  - **Detection Tubes (old technology-PH_3, MB, COS, CO_2)**
  - **IR portable units (PH_3, MB, COS, SF)**
  - **UV units (for ozone)**

Safety Issues Research:

- **Worker Exposure:**
  - Lowering of TLV and/or PEL
  - Increased demand on using SCBA
- **Public Safety:**
  - Continuous pressure for larger buffer zones
  - On-site and off-site exposure by non-participants
- **Application of fumigants:**
  - Pressure testing of facilities (half-life decay)
  - More off-site application of fumigants
  - Emphasis on monitoring gas concentrations
  - Better distribution analysis

Stewardship Research:

- **Pre-fumigation testing**
  - **Sealing, construction and half-life**
  - **Weather**
  - **Distribution**
- **Handling of fumigant**
- **Application Methodology**
- **Concentration Monitoring**
- **Aeration**
- **Resistance Issues**

Sustainable Treatments Research:

- **Reduction in Fumigants/CA Used**
  - **“Systems Approach” solutions**
  - **Only “as needed” research**
    - Insect Resistance to treatments
    - Population monitoring
    - “Mating Disruption” studies
    - “Trap and Kill” techniques
- **Physical Methods**
  - **Heat/cold techniques**
  - **Hermetic/Vacuum treatments**
- **Behavioral Studies**

Environmental Issues Research:

- **Ozone depletion (Montreal Protocol)**
- **"Hot-House" effects from CO_2 emissions**
- **Non-fumigant alternatives – reduction of treatments**
- **Control emissions to atmosphere**
  - **Scrubbing technology**
  - **Adsorption technology**
  - **Recycling technology**

Where do we go from here?

- **Emissions Control?**
- **Behavioral Studies?**
- **Better Altermatives?**
- **Better Detection?**

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