Area-wide Management of Stable Flies

David Taylor
USDA-ARS Agroecosystems Management RU
Lincoln, Nebraska
Stable Fly (*Stomoxys calcitrans*)
(Diptera: Muscidae)

- Adults have biting mouth parts
- Obligate blood feeders
- Larvae develop in decomposing vegetative materials
Stable Flies
Blood Feeding

• Both sexes blood feed
  – Required for mating and egg production

• Blood feed 1-2 times / day

• Female requires ≥5 blood meals for 1\textsuperscript{st} batch of eggs
  – ≥3 for subsequent batches

• 2-4 minutes to feed
  – Most of adult life off hosts
Vectors

• Biological
  – *Habronema microstoma*

• Mechanical (none confirmed)
  – Lumpy Skin Disease of cattle
  – Bovine Leukemia
  – Equine infectious anemia
  – *Trypanosoma evansi*
  – *Besnoititia*
In the Buffet Line
Larval Developmental Sites

• Decomposing vegetative materials
  – Often mixed with urine and dung
Developing in Crop Residues
Pineapple – Costa Rica

1500 - 2000 SF / m²
20,000,000 / ha
<table>
<thead>
<tr>
<th>Crop</th>
<th>SF/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broccoli</td>
<td>22</td>
</tr>
<tr>
<td>Celery</td>
<td>25</td>
</tr>
<tr>
<td>Cabbage</td>
<td>46</td>
</tr>
<tr>
<td>Caulis</td>
<td>35</td>
</tr>
</tbody>
</table>
Sugarcane - Brazil
Area-wide Management of Stable Flies

• Why?
• Challenges
• Prerequisites
• Management options
Why?

• **High vagility**
  - 225 km (Hogsette & Ruff 1985)
  - ≈30 km in 24 hours (Bailey et al. 1973)
  - 8 km in 2 hours (Eddy et al. 1962)
  - Median 1.6 km (Taylor et al. 2010)

• **Larval developmental sites**
  - Diverse, dispersed & often difficult to locate

• **Low economic threshold**
  - ≈15 flies / animal
Challenges

• High population density
• Both males and females blood feed
  – When livestock not available, very annoying to humans
  – Potential disease vectors
• Very adaptable
Prerequisites

• Public support / consensus / demand
• Regulatory Authority
  – Standards/regulations
  – Enforcement
• Funding
Management Options

- **Genetic** – SIT, genetic load, GMO, etc.
- **Cultural/sanitation**
- **Biological**
- **Traps & Targets**
- **Chemical**
  - Immature
  - Adult
- **On-animal**
  - Chemical – repellents & insecticides
  - Physical – hoods, socks, blankets, etc.
CIA Principle in IPM

• Control is most effective when the target is:
  – Concentrated
  – Immobile
  – Accessible
Controlling Immature Stable flies in Substrate

• Cultural / Sanitation
  – Remove or modify the substrate
• Biological
• Chemical
Cultural / Sanitation
Biological
Chemical

Stable Fly Adult Emergence from Hay Feeding Sites Treated with Cyromazine

- Untreated
- Cyromazine

Stable Flies / m² day
- 26 May
- 09 Jun
- 23 Jun
- 07 Jul
- 21 Jul
- 04 Aug
Controlling Adult Stable flies

- Biological
- Traps & Targets
- Chemical
- On-animal
Chemical
Traps & Targets
On-animal
Summary

• Area-wide management of stable flies involves application of traditional technologies in a coordinated, organized and mandated manner.
  – Cultural/sanitation
  – Biological
  – Traps & Targets
  – Chemical
  – On-animal
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Questions?