Best Practice for Integrated Mosquito Management in Anastasia Mosquito Control District

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Best Management Practices (BMP)

- **Formation** of program (AMCD since 1948)
- Usage of all possible **Resources** and funds
- **Enhancement of Education & Outreach** (2003)
- **Enhancement of Surveillance** of Vector Mosquitoes and **Justifications** for Control Action
Best Practice for Integrated Mosquito Management (components)

- **Surveillance** - habitats, larval & adult population, vector and pest species
- Mapping/GIS/GPS - for resources and monitoring
- **Action.** Florida Statues (Chapter 388 & 5E-13). Justification for pesticide application: Service request, LRC, traps, human and animal cases, sentinel chickens/mosquito pool, & weather condition
- Source reduction (emptying containers, tire collection)
- Biocontrol (fish)
- Chemical control & Resistance monitoring
- Employee training & public **education**/community outreach (enhanced)
- **Applied research** (enhanced collaboration)
- Quality control/ satisfaction survey/program review/evaluation
- Record keeping
St. Johns County, FL

St. Johns County is located in Northeast Florida

637 Sq. Mi. (>389,760 acres)

>230,000 population

Bordered on the east by the Atlantic Ocean and on the west by the St. Johns River. 44 species (slat & fresh water mosquitoes)

47 miles of Intracoastal Waterway bordered by salt marsh
Anastasia Mosquito Control District

- AMCD is a special district (5 elected Commissioners) and a professional /technical service organization.
- The District Staff, Technicians and all Inspectors/Sprayers have to be licensed and certified by DACS.
AMCD’s Programs

• **Operation** (50% efforts): 1. Customer/professional service (adapt technology)
  2. Surveillance (mosquito population, arbovirus, & pesticide resistance)
  3. Control action (ground/aerial)

• **Applied Research** (25% efforts) through collaboration

• **Education** (public education & employee training (25% efforts)
Surveillance Highlight & Enhancement

- Service request monitoring & mapping
- Native & exotic species & vector species
- Proactive – risk assessment & justify for control action
- Technique/tool selection – based on life cycle/stage
Arbovirus & Adult Mosquito Surveillance

- Sentinel chicks (60) & mosquito pooling
- Service request monitoring
- CDC traps (35)
- Gravid traps
- BG traps (24)
- Landing rate count site (145)
- Rain Gauge (49)
Major Vector for Dengue, Chikungunya, & Zika Viruses

*Aedes aegypti* is back (challenge)
- Container-breeding mosquitoes
- Human preference
- Daytime biter/short distance flight

*Aedes albopictus*
- everywhere
Customized Database System
GeoMosquito developed by Mobisoft

Online service request by website and mobile phone, service requests with Technician interface, customer and mapping interface, data record and report

Fogging Information Link
Distribution (hot spots) of service requests (3,000-5,000/year)
Eggs & Immature-stage Surveillance

Oviposition cups

- Nonlethal oviposition cup
- Lethal oviposition cup
- Dipper for larval survey
Bromeliads in downtown are one of major breeding sites for *Aedes aegypti* & *Ae. albopictus* & a priority for treatment

- We treat larvae using BTI
- We treat adults using a LongRay ULV with Aqualuer 20-20
Collaborators & Applied Research
Equipment Evaluation
MOU & AMCD’s Strategies

- County DOH and AMCD had an MOU (Memorandum of Understanding) concerning human case release / street address

- Targeted (Barrier) control:
  - Systematic elimination/control of oviposition sites, ULV spraying, and thermal/barrier spraying within a certain distance (< 300 m) of houses and spraying within 1 mile for Dengue, Zika, and Chikungunya, within 5 miles for WNV and EEE (save time and money), based on flight distance and activity patterns of vector species.

- Non targeted control:
  - Random elimination of the large numbers of oviposition sites as the counterparts of targeted control and spraying whole area (time consuming with high cost).

Promotion of the Best Practices for IMM
Barrier Control Perimeter (1 mil for DEN, Chik-V, & Zika, 5 mil for WNV, EEE, & Malaria Vector Mosquitoes)
Promotion of the DOH’s Drain & Cover-up

DRAIN standing water to stop mosquitoes from multiplying

COVER skin with clothing and use mosquito repellent

COVER doors and windows with screens to keep mosquitoes out
Community outreach and education – Walk downtown with Mayor and community
Service & Cost Increases since 2003

- Population increase: 130K to 230K. provided services increase: 1,000/year to 5,000/year
- Program increase/enhancement: Season starts earlier;
- Adapted MapVision & new data system for service requests, promoted education and applied research programs
- Personal service & service benefit increases
- Operation and material cost increases (gasoline, pesticides, equipment, & contract services)
- BUT, REVENUE REDUCTION/BUDGET CUT ($4.5m in 2003 to 3.5m/year since 2005)
Accomplishments since 2004

- No local-acquired human cases since 2004, 22 horse cases (2001-2006) to 7 horse cases (2006 to 2017)
- Personal: 37 FT & 14 PT to 27 FT (replaced by 10 seasonal FT); Top managers (3 to 2); Station supervisors (4 to 1)
- Facility: Centralization since 2006 (4 to 1)
Other Accomplishments since 2004

- Trained 10 post doctors/visiting scientists, 2 Ph.D., 1 Master, 1 B.S. and 40 intern students. AMCA hub host for training the trainers in 2017 (certified 98 students)
- Contracted /collaborated with 4 international universities, 3 federal agencies, and 9 US universities
- Organized/held 15 annual arbovirus /mosquito control workshops with USDA/CMAVE, 13 AMCA symposia, and 5 FMCA symposia and provided 280 CEU’s credits
- Received >$1.5m of grant fund, equipment, and pesticides to support district programs
- Employees received 12 national and state awards
- Published 6 book chapters, 4 vol. of TBFMCA, and > 100 publications
Employee Education since 2007
Awarded (4 national & 8 state)
Current Facility (18 acres)
Phase II: under construction
AMCD complex (18 acres)
Thank You

- For our Board and employee’s support
- All collaborators & welcome new cooperation
- Accept/host visiting scientists, intern students, and professors who want to have sabbatical leave
- For your attention

15th Workshop