TOPICAL ACARICIDES
DEER

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PROBLEMS ASSOCIATED WITH AN OVERABUNDANCE WHITE-TAILED DEER

- Ecological degradation
- Vehicle collisions
- Agricultural damage
- Home landscape/garden damage
- Decline in herd health
- Lyme disease & other tick-borne illnesses
MANAGEMENT OPTIONS FOR WHITE-TAILED DEER FOR TICK CONTROL

- Reduction deer abundance
  Use of regulated hunting
  Controlled hunts
  Use sharpshooters

- Exclusion
  Use fencing and repellents

- Treatment deer
  Systemic ivermectin-mediated feed
  Topical acaricides
  Amitraz-collars
  Anti-tick vaccines
Mouse home range
0.1-0.5 acres

Deer urban home range
Does 20-104 acres, Bucks 68-320 acres
Old Lyme 142 acres, core 20 acres
Deer populations Texas exploded
- Deer major alternate host for cattle fever ticks
- Confounding eradication program
- Ivermectin corn technology
- ARS-patented 4-poster device topical application acaricides
First Permethrin 4-Poster
Ixodes Scapularis, 1995-1998

- Goddard Space Center, MD (2.55 km²)
- Control Patuxent Wildlife Research Center, MD (10.1 km²)
- Both sites fenced and enclosed. Used 10% permethrin on rollers of the 4-poster self-treatment station

Results
Year 2: 100% control ticks on deer.
Year 3: Reduction questing adult, nymphal & larval ticks by 91-100%
Reduction larval and nymphal ticks on mice by 70-95%

Determine efficacy Point-Guard (2% amitraz) applied to white-tailed deer by the USDA-ARS 4-poster for control *Ixodes scapularis* and *Amblyomma americanum*.

- Five states
  1. Old Lyme, New London Co., CT
  2. Naval Weapons Station Earle, NJ
  3. Bedford, Westchester Co., NY
  4. Narragansett, Washington Co, RI
  5. Loch Raven, Baltimore Co., MD
  also BARC, Beltsville, and Gibson Island, MD.

- Study ran 1997-2004
USDA Northeast Area-wide Tick Control Project Leaders

- John E. George, Ph.D., J. Mathews Pound, PhD., and J. Allen Miller, Ph.D. (retired), USDA, ARS, Knipling-Bushland US Livestock Insects Research Laboratory, Kerrville, TX
- Durland Fish, Ph.D. (retired), Yale School of Medicine, New Haven, CT
- Gary A. Mount, Ph.D. (retired), USDA, Gainesville, FL
- Kirby C. Stafford III, Ph.D., CT Agricultural Experiment Station, New Haven, CT
- Anthony J. DeNicola, Ph.D., White Buffalo, Inc., Hamden, CT
- Terry L. Schulze, Ph.D., Contractor, Perrineville, NJ
  Robert A. Jordan, Ph.D., Wildlife Consultant, Edison, NJ
- Thomas J. Daniels, Ph.D., Fordham Univ. Calder Ecology Center, Armonk, NY
- Thomas N. Mather, Ph.D., University of Rhode Island, Kingston, RI
- Mathew C. Nicholson, Ph.D., University of Rhode Island, Kingston, RI
- John F. Carroll, Ph.D. (retired), USDA, ARS, LPSI, Beltsville, MD
STUDY DESIGN & RESULTS

- 23-25 feeders each site
- Core area 518 ha
- Used 2% amitraz
- During the study, maximal significant (p < 0.05) efficacies against nymphal blacklegged and lone star ticks at individual sites ranged from 60.0 to 81.7 and 90.9 to 99.5%, respectively.

The major environmental factor that reduced efficacy was the occurrence of heavy acorn masts, which provided an alternative food resource for deer.
Deer Feeding at a 4-poster in Old Lyme, CT

Point-Guard
(2% amitraz)
During the study, maximal significant (p < 0.05) efficacies against nymphal blacklegged and lone star ticks at individual sites ranged from 60.0 to 81.7 and 90.9 to 99.5%, respectively. The major environmental factor that reduced efficacy was the occurrence of heavy acorn masts, which provided an alternative food resource for deer.
DEER-TARGETED ACARICIDES IMPACT ON LYME DISEASE

EVALUATION OF DEER-TARGETED INTERVENTIONS ON LYME DISEASE INCIDENCE IN CONNECTICUT

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Original treatment vs. control town
Lyme disease reduction, P = 0.04
Commercial 4-poster

• 4-POSTER™ TICKICIDE Y-Tex Corp., Cody, WY (10% permethrin, EPA Reg. No. 89039-7).
• Approved by EPA summer 2003 for restricted use on white-tailed deer with 4-poster
• 4-poster manufactured by Dandux Outdoors, a subsidiary of J.C. Daniels, Inc., Maryland.
Forty-two 4-posters at 7 treatment sites with 7 control sites.

- Cape Cod, Martha’s Vineyard, Nantucket
- Blacklegged ticks reduced only 8.4%, possibly due to lower density deployment and landscape and mammalian community characteristics.
Nantucket – Fawns and some does can feed without touching the rollers…very narrow necks. Note, sometimes rollers get bent over making them ineffective…springs need to be stronger. This can reduce effectiveness of the station for days or weeks…we service them every 2 weeks.

Pictues provided courtesy Larry Dapsis
Cape Cod – Raccoons sometimes sit or lean back against the rollers. A number of the cape stations were loaded with 300# of corn from mid-Sept to mid-Nov…mostly consumed by raccoons based on imagery. Pictures provided courtesy Larry Dapsis
4-posters
Shelter Island (2 areas, n = 60 locations)
Fire Island (n = 8 locations)
Control or reference site
Village of North Haven (NH)
Feeding dominated by deer, raccoons, squirrels and birds
Tick abundance at Shelter Island was significantly lower compared to reference site
By 2010, 72-85% reduction both tick species, *I. scapularis* and *A. americanum*.

Treatment of white-tailed deer with topical acaricide can provide effective control *Ixodes scapularis* and *Amblyomma americanum* on the animals.

4-poster technology can reduce host-seeking tick abundance.

Some data suggest use can potentially impact human LD.

Many issues include:

1. Adequate access to the devices or coverage
2. Dominant animal monopoly
3. Non-target animal use
4. Maintenance of corn and pesticide on the rollers
5. Servicing labor, broken or bent rollers
6. Alternative food sources (i.e., acorns) that decrease usage
7. Label restrictions on placement (i.e., distance from homes and children).
Tick Management Handbook

An integrated guide for homeowners, pest control operators, and public health officials for the prevention of tick-associated disease

Revised Edition

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