

Rodent-Targeted Acaricides: Topical Pesticides

An Update: Current Status/State of the Art

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Division of Vector-Borne Diseases

Fort Collins, CO

Integrated Tick Management Symposium
Washington, DC, May 16-17, 2016

Area-Wide Acaricides to Control Ticks

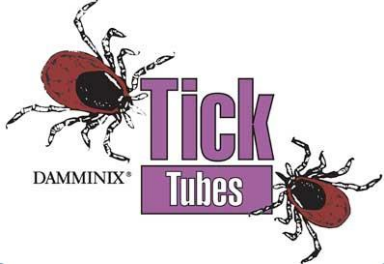
- *Ixodes scapularis* 2 yr life cycle
- Area-wide acaricides to target nymphal ticks
 - Doesn't require a lot of in depth knowledge of life cycle
 - Effective – acarological risk index
(# of infected host-seeking nymphal ticks)
 - Liquid Formulations (Stafford et al. >90%)
 - Granular Deltamethrin (Schulze et al. >95%)
- People won't use in endemic areas of US
 - CDC, KAB Studies (<25% spray for ticks)



Alternatives to Area-Wide Acaricides

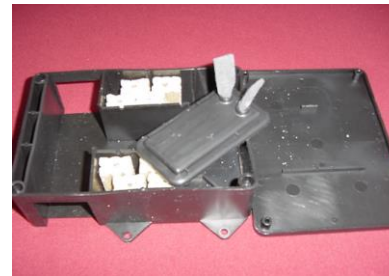
- DEER
 - Deer reduction
 - Exclusion (fencing)
 - USDA 4-Poster (host-targeted)
- LEAST TOXIC
 - Soaps, Desiccants, Natural Products, Fungus
- SMALL MAMMALS
 - Antibiotic baits, RTV's, IGR's
 - Host-targeted (Damminix, Select TCS)





Host-Targeted Approaches to Tick Control

- **DAMMINIX® Tick Tubes**
 - Permethrin-treated cotton nesting material
- **SELECT Tick Control System (TCS)**
 - Non-toxic bait and topical acaricide (fipronil)



DAMMINIX® Tick Tubes Label

DAMMINIX® A *TICK TOXICANT* as an aid in the control of ticks (that may carry Lyme Disease) that infest mice and nests of mice found around yards, play areas, parks, brush, paths, and in woodlands

- ACTIVE INGREDIENT: Permethrin 7.4%
- INERT INGREDIENTS: 92.6%
- TOTAL: 100.0%
- EPA Reg. No. 56783-1 EPA Est. No. 5693 MA1
 - Available in 33 US States



- © 2015, ECOHEALTH, INC. 56 HAWES STREET, BROOKLINE, MASSACHUSETTS 02446 617-742-2400
- CONTENTS: 24 Damminix Tubes, each containing 4.5 grams or 0.16 oz.

How DAMMINIX® Tick Tubes Work

DAMMINIX® Tick Tubes reduce the risk of Lyme disease by using mice as “couriers to kill disease carrying blacklegged ticks



DAMMINIX® Tick Tubes – Directions For Use



- Target all brush-covered & woodland areas to be treated
 - Maximum distance between tubes not to exceed 10 yards
 - Place in mouse specific habitat (not mowed lawns, open grasslands)
- Treatment Around Yards
 - Place tubes within 1 yard of lawn edge, in flower gardens, under brush, along fences, etc
- Treatment of Woodlots
 - Place tubes in a contiguous array (grid design), ≤ 10 y spacing
- Two applications/yr between April 1 and mid-September
 - 6 tubes/0.125 acre; 24/0.5 acre; 96 tubes/2.0+ acre

DAMMINIX® Tick Tubes Fact Sheet

- Environmentally friendly approach to control ticks.



DAMMINIX® Tick Tubes Fact Sheet

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- Developed by researchers at the Harvard School of Public Health.



DAMMINIX® Tick Tubes Fact Sheet



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- Target white-footed mice, providing permethrin-treated cotton nesting materials in a biodegradable cardboard tube.



DAMMINIX[®] Tick Tubes Fact Sheet



- Environmentally friendly approach to control ticks.
- Developed by researchers at the Harvard School of Public Health.
- Target white-footed mice, providing permethrin-treated cotton nesting materials in a biodegradable cardboard tube.
- Tests have demonstrated a $\geq 97\%$ reduction of host-seeking ticks.



DAMMINIX® Tick Tubes Fact Sheet



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- Applied twice per year, spring and mid-summer, targeting nymphal and larval blacklegged ticks.

DAMMINIX® Tick Tubes Fact Sheet



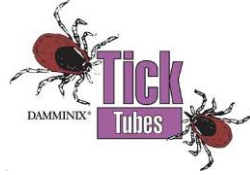
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- Manufactured in US by EcoHealth, Inc., a Boston-based company.

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- Manufactured in US by EcoHealth, Inc., a Boston-based company.
- Available at hardware stores, lawn/garden centers, and professionals

DAMMINIX® Tick Tubes – Field Trials



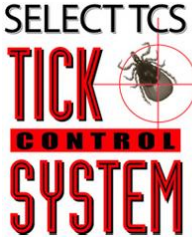
- Mather, Ribeiro, Spielman. 1987. Lyme disease and babesiosis: acaricide focused on potentially infected ticks. Am J Trop Med Hyg.
 - 90% reduction in ticks/animal; 72% reduction infestation rate
- Daniels, Fish, Falco. 1991. Evaluation of host-targeted acaricide for reducing risk of Lyme disease in southern NY state. J Med Entomol.
 - No observed differences in host-seeking ticks or proportion of infected ticks
- Stafford, KC III. 1991, 1992, 1993. Effectiveness of host-targeted permethrin in the control of *I. dammini* in southeastern CT. J Med Entomol.
 - 3 yr of treatment demonstrated no reduction in risk of exposure to spirochete-infected, host-seeking nymphs & adults of *I. dammini*.
- Deblinger & Rimmer. 1991. Efficacy of permethrin-based acaricide to reduce the abundance of *I. dammini*. J Med Entomol.
 - Confirmed efficacy of Damminix for reducing abundance of vector ticks.



Select Tick Control System® (TCS)



- Environmentally friendly approach to control ticks.
- Target mice and chipmunks, non-toxic attractive bait and treated wick to passively treat small mammals in a child-resistant packaging.
- Developed by researchers at CDC/DVBD (formerly MaxForce TMS)
 - Licensing Agreement with Tick Box Technology, Norwalk, CT
 - Available to public as of Aug 2011
 - EPA registered in 32 states
- Applied twice per year, spring and mid-summer, targeting nymphal and larval blacklegged ticks.
- Available through licensed Pest Management Professionals



SELECT Tick Control System® (TCS) Label



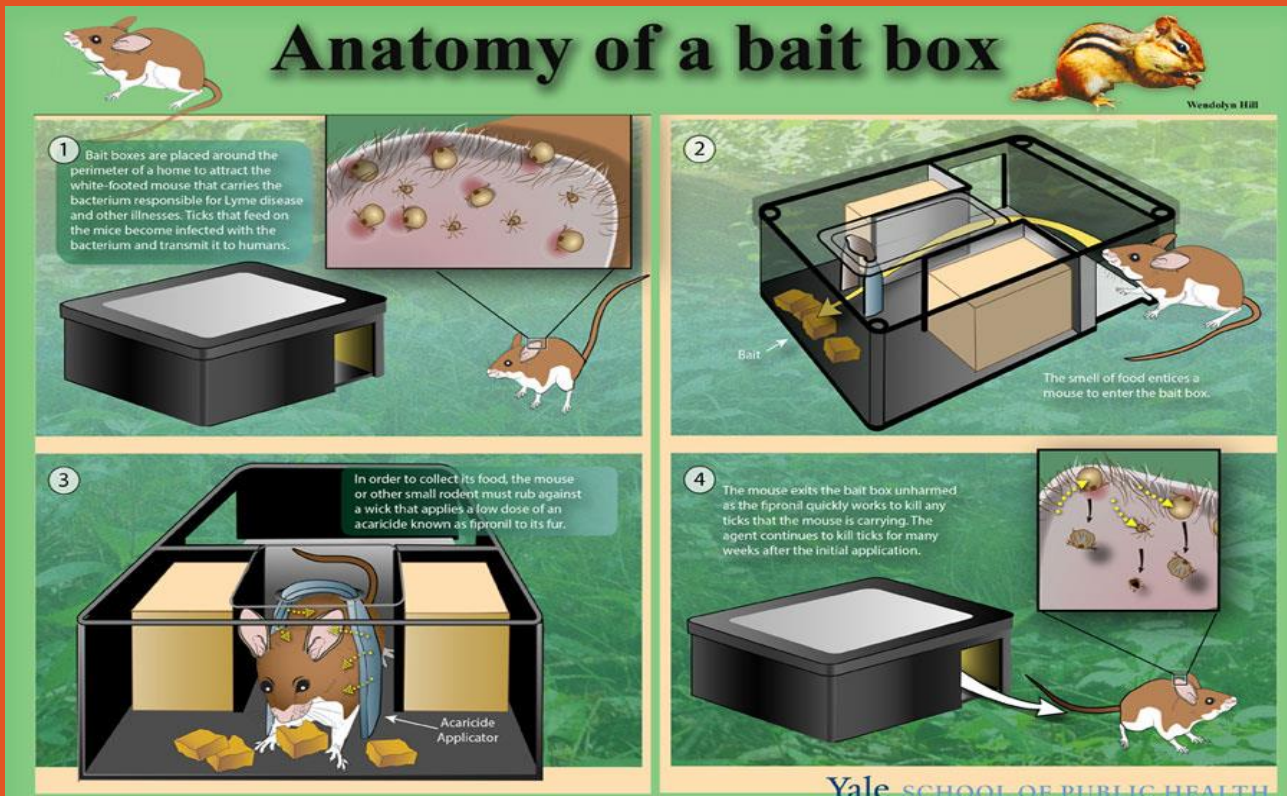
- ACTIVE INGREDIENT: Fipronil 0.7%
- INERT INGREDIENTS: 99.3%
- TOTAL: 100.0%
 - Amount of AI/station = 25.5 mg
- EPA Reg. No. 85306-1 EPA Est. No. 85306-CT-001
 - Available in 32 US States

- © Tick Box Technology Corporation, 1 Testa Pl, Norwalk, CT 06854
(203) 852-7171



How SELECT Tick Control System® (TCS) Bait Boxes Work

Easy-to-use, low maintenance, effective means to reduce ticks and interrupt the transmission cycle without harming the environment



SELECT TCS® Tick Tubes – Directions For Use



- Target all brush-covered & woodland areas to be treated
 - Maximum distance between tubes not to exceed 10 yards
 - Place in mouse specific habitat (not mowed lawns, open grasslands)
- Treatment Around Yards
 - Place tubes within 10 m of lawn edge; 10 y spacing of boxes
- Treatment of Woodlots
 - For maximum control, a 2nd additional row 10 m in may be desired; 10 y spacing
- Two applications/yr between mid-April/May thru September/October
 - 10 boxes /0.5 – 1/0 acre (size of lot and habitat determines # of boxes)

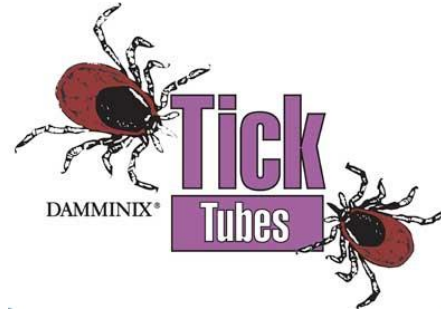
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SELECT Tick Control System® (TCS) – Field Trials

- Dolan et al. 2004. Control of immature *I. scapularis* on rodent reservoirs of *B. burgdorferi* in a residential community of southeastern CT. J Med Entomol.
 - 50% reduction in host-seeking nymphs; 57% reduction in infected nymphs
- Schulze et al. 2007. Integrated use of 4-Poster passive topical treatment devices for deer, targeted acaricide applications, and MaxForceTMS bait boxes to rapidly suppress populations of *I. scapularis* in a residential landscape. J Med Entomol.
 - 94% reduction small mammal tick burdens
 - >90% reduction in host seeking ticks
- Dolan et al. Evaluation of doxy bait and topical fipronil in a single bait box to control *I. scapularis* and reduce *B. burgdorferi* and *A. phagocytophilum* infection in small mammals reservoirs and host-seeking ticks. J Med Entomol. Submitted.
 - 81% reduction in host-seeking nymphal *I. scapularis*
 - 96% reduction in infected small mammals and 93% reduction in infected ticks
- Schulze et al. Evaluation of Select TCS, a host-targeted bait box to reduce exposure to *I. scapularis* in a Lyme disease endemic area of NJ. J Med Entomol. In Preparation.
 - >97% reduction in host-seeking nymphal *I. scapularis*



For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.