TEXAS A&M AGRILIFE EXTENSION

Use of IPM Principles to Control Forage Pests and Other Farm Pests

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Fall armyworms

Armyworms

- Outbreaks are difficult to predict
  - Infestations occur some where in TX
  - After rains in early fall
- Common species
  - Fall armyworm
  - True Armyworm
  - Yellow striped armyworm
  - Beet Armyworm

Biology

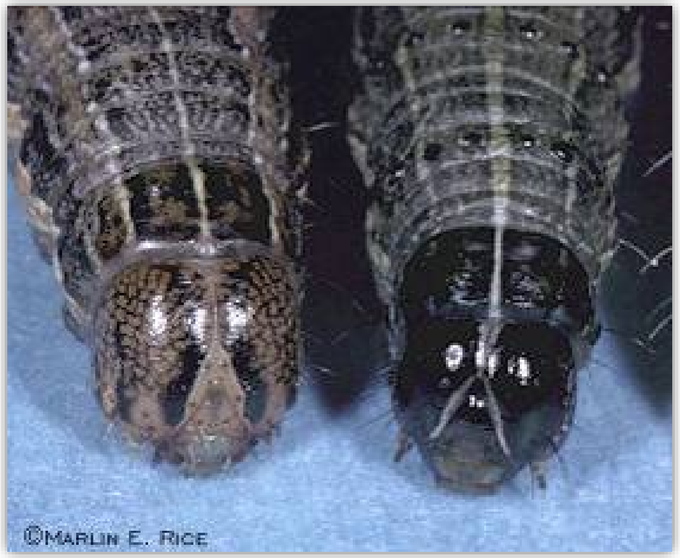
- Armyworms have 4 life stages
  - Egg –
    - Very small
    - Laid in clusters of 50 or more
    - Covered with grayish, fuzzy scales
    - Seldom seen in grasses
    - Laid at base of host plants

Biology

- Armyworms have 4 life stages
  - Egg –
  - Larva – Caterpillars
    - Very small at first
    - Feed 2-3 weeks
    - 26 – 37 mm
    - Various color patterns
    - Five instars

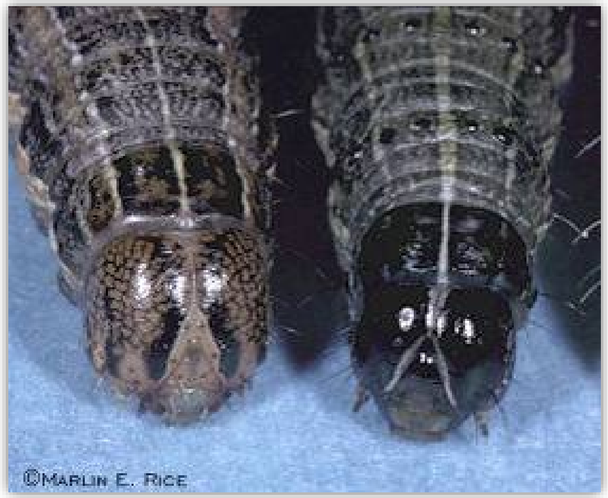
Armyworms

- Fall Armyworm Larvae
  - Prominent white “Y” between the eyes
  - Four large spots on last segment of body
  - Light tan to green shades in color
  - Head is brown or black



Armyworms

- True Armyworm Larvae
  - Lack inverted “Y” and 4 spots
  - Orange strip with white boarder
  - “Honey-comb” pattern in eyes
  - Dark band at top of each proleg



Pest Status

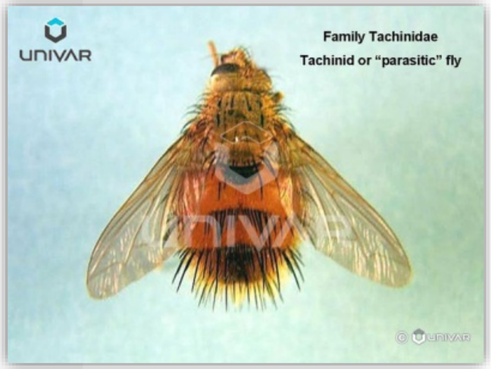
- Larvae strip foliage
- Then move to next available
- High populations appear to march side by side to new food

Plant Damage

- Defoliation
- Small larvae
  - 1st to 3rd instars cause little damage
  - Create “windowpane” effect
- 4th & 5th instars consume 85% of total foliage

Natural Enemies

- Parasites
  - Wasps
  - Flies
- Diseases
  - Viruses
  - Fungi



Natural Enemies

- Predators
  - Ground beetles
  - Birds
  - Skunks
  - Rodents

Control

- Necessary when
  - Large numbers
  - Excessive plant damage
  - 2-3 larvae/ sq foot on seedlings
  - 3-4 larvae/sq foot for older plants

- No preventive treatments
  - Inspections are crucial
    - Late evening/early morning, cool/cloudy weather
  - Early detection – best management
  - Look for leaf feeding

Insecticides

- Mustang Max (9.6% zeta-cypermethrin)
  - 0 d for hay
  - 7 d for forage, straw & seed screenings
  - 1st pasture & hayfield labeled pyrethroid
  - Controls many insects including grasshoppers

- Warrior II – (22.8% lambda cyhalothrin)
  - 0 d – grazing & forage
  - 7 d - harvest

Syngenta
Warrior II
with Zeon Technology.

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Always read and follow all label instructions on pesticide use and restrictions.

Insecticides

- Baythroid XL (12.07% cyfluthrin) –
  - 0 d – grazing (grass for hay, pasture, rangeland & seed)
  - 7 d – harvest or graze (grass with alfalfa)

- Karate Z (13.1% lambda cyhalothrin) –
  - 0 d – grazing or forage
  - 7 d – hay

Always read and follow all label instructions on pesticide use and restrictions.

Insecticides

- Lambda-Cy (11.4% lambda cyhalothrin)
  - 0 d – grazing or forage
  - 7 d – harvest
- Besiege (9.26% chlorantraniliprole & 4.63% lambda cyhalothrin)
  - 0 d – grazing or forage
  - 7d - harvest
- Tombstone Helios (25% cyfluthrin)
  - 0 d – grazing or harvest

LAMBDA-CY

Besiege®

TOMBSTONE™ INSECTICIDE

Always read and follow all label instructions on pesticide use and restrictions.

Insecticides

- Dimilin® 2L (22% diflubenzuron)
  - 1 d – harvest
  - 0 d – grazing
  - Insect dies while molting
  - Acts as an IGR
  - Must apply before larvae reach ½” - AW
  - Won’t work on large larvae – AW
  - Residual for 2-3 weeks - AW
  - Preventative tactic for high-risk fields
  - Rate 2 oz/acre

Always read and follow all label instructions on pesticide use and restrictions.

Insecticides

- Tracer (Spinosad)
  - No grazing until dry
  - 3 d – harvest or fodder; 0 d – forage
  - Treat newly hatched or small larvae
  - Use higher rates for larger larvae
  - Rate 1-2 oz/ac

- Intrepid 2F (methoxyfenozide) –
  - 7 d – harvest; 0 d – forage; 0 d – grazing
  - Begin application at first signs of feeding damage
  - Use higher rates for heavy infestations
  - An IGR

Dow AgroSciences

Tracer®

Naturalyte® Insect Control

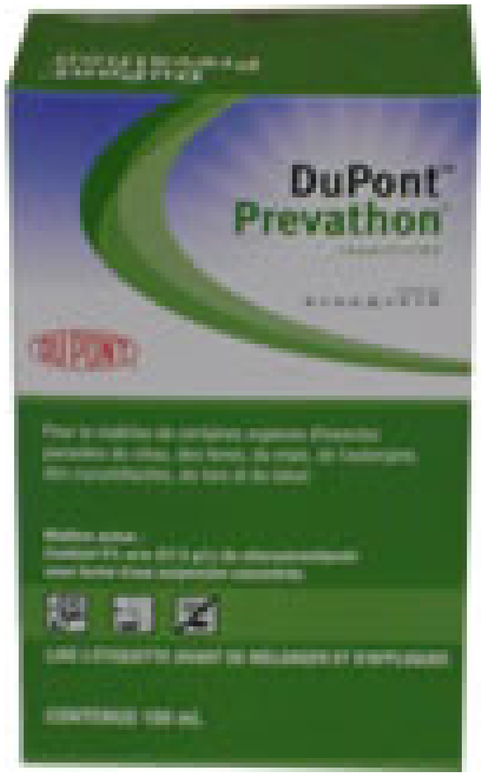
Intrepid® 2F

INSECTICIDE

Always read and follow all label instructions on pesticide use and restrictions.

Insecticides

- Prevathon/Vantacor (5% chlorantraniliprole)
  - FMC now, registered for armyworms in 2012
  - 2ee label for GH in TX – grass forage, fodder and hay
  - 0 d for harvest & grazing
  - Not a Restricted Use insecticide
  - 7–8-weeks residual



VANTACOR™
INSECT CONTROL

POWERED BY RYNAXYPYR® ACTIVE

Always read and follow all label instructions on pesticide use and restrictions.

Insecticides

- Malathion 57% & Malathion ULV
  - 0 days to harvest or graze

- Sevin® (carbaryl)
  - 14 d - grazing or harvest

Always read and follow all label instructions on pesticide use and restrictions.

Insecticides – something New 2019

- Fawligen
  - *Spodoptera fruigiperda* virus – biological insecticide
  - Virus self replicates and company claims will provide season-long control suppression
  - No impact on beneficial species
  - No residual
  - Low application rates and reduced storage requirements
  - Can be applied by ground, air or chemigation
  - Rainfall enhances performance
  - Very new, no efficacy data from US yet

Bermuda grass stem maggot

Introduction of Bermudagrass stem Maggot

- Widely distributed in Southeast Asia, China, India, Indonesia, and Japan
- 1974: Found damaging bermudagrass turf in Hawaii
- 2009: Found in California
- 2010: Found in Georgia and southern Mexico
- 2013: First report in Texas

BGSM Description

- The adult is a small fly, roughly 1/8 inch long
- Gray with yellow abdomen and dark red-brown eyes
- Abdomen can have up to 8 spots
- Head capsule has two colored stripes between eyes

BGSM Description

- Larvae are creamy-white to yellowish
- Grow to about 1/8 inch long
- Typical maggot appearance
- Usually not seen because they leave stem before damage is evident

BGSM life cycle

- Fly deposits egg on leaf or stem
- Egg hatches within 2-3 days
- Maggot bores into stem at top node then tunnels within stem for 6-12 days
  - Damage not evident for 1-3 days
- Maggot cuts out of stem to pupate in the soil
- Pupates for 7-10 days
- Adults live 14-20 days and lay around 30 eggs
- Completes life cycle in 2-3 weeks, with multiple generation per year

BGSM damage

- Top two leaves appear white, wilted, and dead
- Dead leaves are easy to pull from the sheath
- Split open stem just below dead leaves to confirm tunneling and/or maggot presence
- Infested field will have a frosted or bronzing appearance
- Maggot leaves an exit hole is stolon when exiting to pupate in soil

Figure 1A. "Bronzing" of bermudagrass hay fields as a result of bermudagrass stem maggot damage. *Photo by Will Hudson.*

Figure 1B. The bronzing is the result of damage done at the uppermost node that results in the deterioration of the top two to three leaves of the plant. *Photo by Lisa Baxter.*

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Damage Potential

- Damage causes stem/stolon to stop growing
- New shoot will be formed at lower nodes, but delays cutting

- If damage appears within a week of harvest, yield loss will be low
- If damage appears when regrowth is 6-8 inches, yield loss will be more severe

- If growing conditions are favorable for rapid growth loss of upper leaves will have minimal impact on yield
  - Poor growing conditions will result in higher yield loss

BGSM Damage

- BGSM prefer dense canopies
- High N fertility rates tend to suffer more BGSM damage
- Grazed pastures not as likely to suffer BGSM damage, because livestock will eat eggs, maggot, and dead tissue
- Pastures isolated from other bermudagrass pastures less likely to be heavily infested

Photo: D. Hancock, Univ. Georgia

Scouting for BGSM

- Populations increase as the year goes
- Most economically damage infestation typically occur August-October
- Sample for adults using sweep net or yellow sticky cards
  - Using adult fly captures to determine need for spray has not been successful
- Base the need for spraying on damage
- Scout for damage by cutting 50 stems from 4 different regions of field and inspect for damage

BGSM Damage

Yield loss

- For every 1% damaged stems hay yield is reduced by 8.90 lbs/acre

Quality (highly variable)

- Protein: 0.06% reduction in protein for every 1% stem damage
- Total Digestible Nutrients: 0.05% reduction in TDN for every 1% stem damage
- Acid Detergent Fiber: 0.04% increase in ADF for every 1% stem damage

Treatment Decision Aid

	Cost of Insecticide Application				
Value of Hay $/ton	$10.00	$12.00	$14.00	$16.00	$18.00
180	13%	15%	18%	20%	23%
140	17%	20%	23%	27%	30%
100	23%	27%	32%	36%	41%
60	36%	43%	50%	57%	64%

- Value of hay $140/ton
- Cost of Control $12.00/acre
  - includes pyrethroid+ Surfactant, and application
- Economic Threshold 20% or more damage stems

Managing BGSM

If damage is extensive, areas of stunted growth, or crop is not growing:

- An insecticide alone may not be sufficient for grass to recover,
  - Damaged tillers are shading lower nodes preventing new growth

1. Cut and harvest hay
   - The maggots in the stem will die
   - Sunlight will cause new growth from axillary buds in the grass
2. 7-10 days after baling apply a pyrethroid
   - Will control flies before they are able to lay eggs on regrowth

Managing BGSM

No insecticide will control the maggot once feeding in the stem

Insecticide application will kill the adult fly

Labeled insecticides include Pyrethroids such as:

- Mustang Max, Besiege, and Declare
- Besiege is a premix of prevathon and a pyrethroid, also labeled for FAW
- These pyrethroids also labeled for FAW

Bermudagrass Stem Maggot is **NOT** listed on the Prevathon label

Grasshoppers

Grasshopper biology

- Eggs are laid in late summer and fall
  - In undisturbed, dry soil
- Winter temperature has little effect on egg survival
- Eggs hatch in late April through June
  - Progress through life cycle growing in size
  - Newly hatch grasshoppers lack wings

Photo: Salvador Vitanza

Weather Effects on Grasshoppers

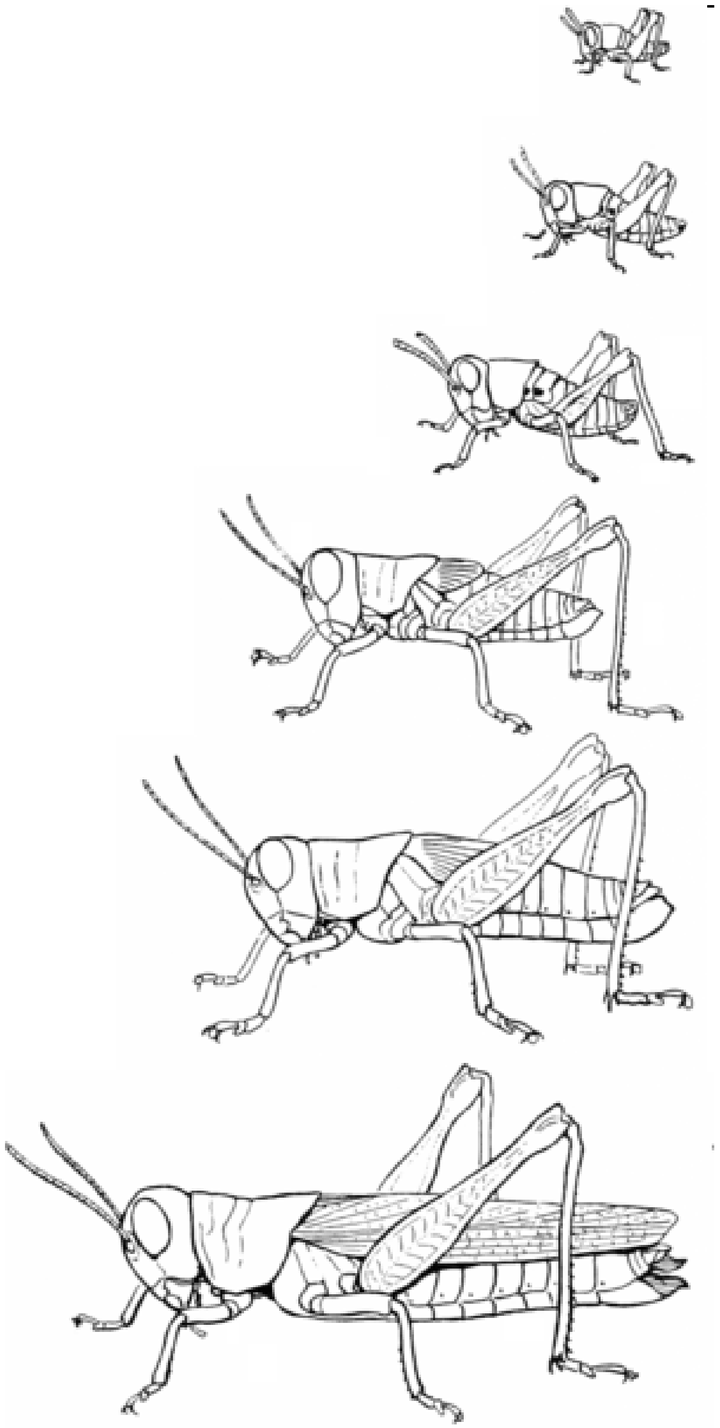
- Spring and Summer rains Drown young grasshoppers
- Cool wet weather favors
  - Disease development, potentially killing the insects
  - Slows down rate of growth
- Survival is favored by hot and dry conditions

Scouting for grasshopper

- Scout for nymphs in spring and early summer
- Check along field edges and the interior of the field
- Walk pasture and estimate number grasshoppers in a couple locations per
  - Figure number on a square yard basis

- Threshold
  - Field border: 21 or more per square yard
  - Interior: 8 or more per square yard
  - Reduce threshold on recently cut pastures or new growth

- The big issue with managing grasshoppers is continual infestation
  - Use insecticides with long residuals if reinfestation may be an issue



Managing Grasshopper

- Treat hatching sites while grasshoppers are still young
  - Young grasshoppers lack wings and cannot move long distances
  - Small area to treat, potentially saves money
  - Can reduce later crop damage caused by mobile adults
- Potential hatching sites
  - Fallow fields, roadsides, fence rows, and hay fields

Managing grasshopper

- Controlling weeds can eliminate food source and discourage egg lay
- Tillage: grasshoppers prefer to lay eggs in undisturbed soil
  - Tillage prior to egg lay can discourage adults from laying eggs in these areas
  - Not practical for improved pasture
- Use of insecticides
  - Multiple chemistries, with different benefits

Grasshopper Insecticides

Pyrethroids

- Cheap
- Short residual
- Not rain fast

Dimilin products

- Cheap
- Only control nymphs
- Good residual
- Not rain fast

Sevin

- Cheap
- Short residual
- Not rain fast

Prevathon/Vantacor and Besiege

- Expensive
- Moves into leaf tissue
- Rain fast
- Excellent residual activity

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Fire Ants

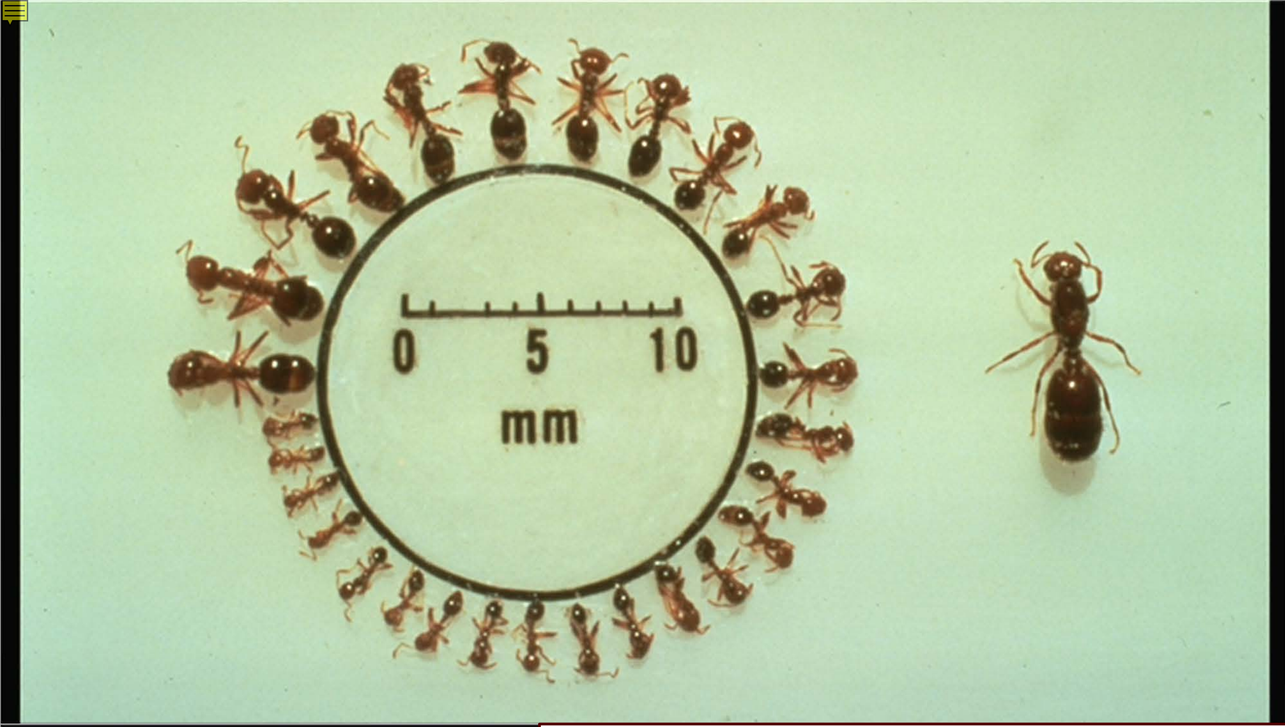
Is Fire Ant Eradication Possible?

- Large scale, no
- Small scale, yes
- Effective Pesticides
- Re-invasion
- Biology : reproductive rate, dispersal
- Money and Time

How Am I Getting Fire Ants?

- Naturally
  - Mating flights
  - Colony relocation
  - Floods

- Landscaping materials
- Soil or mulch introduction



Inside a Fire Ant Colony

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Fire Ant Colony

Treatment Option for Fire Ants

- Baits
- Granules
- Dusts
- Drenches

Broadcast Options

- Granules
  - Applied to lawn
  - Watered in
  - Leaves barrier in soil to prevent fire ants from surfacing
- Not labeled for use in a veggie garden

Individual Mound Treatment Options

- Dusts
- Drenches
- Best for few mounds, or to kill that one big one
- More options for use in a veggie garden

Texas Two-Step

Best proven approach to effectively mange fire ants

Works best in fully infested areas (five or more mounds for each quarter-acre of yard)

Or where there is little or no concern for preserving native ant species

Step One: Baits

- Use fresh bait on dry grass
- Broadcast over the entire yard
- Apply later afternoon or evening
- Use seed spreader, do not mix with fertilizer

Step Two: Individual Mound Treatments

- Chemicals of choice – drench, granule or dust
- Organic – 2 to 3 gallons of very hot/boiling water or mound drenches with plant derived ingredients

Baiting for Fire Ants

Pros:

Attractive

- Soybean oil, corn grit, pesticide

Controls unseen colonies

Economical

Environmentally friendly

Can be broadcast or spot treated

Cons:

Little to no residual

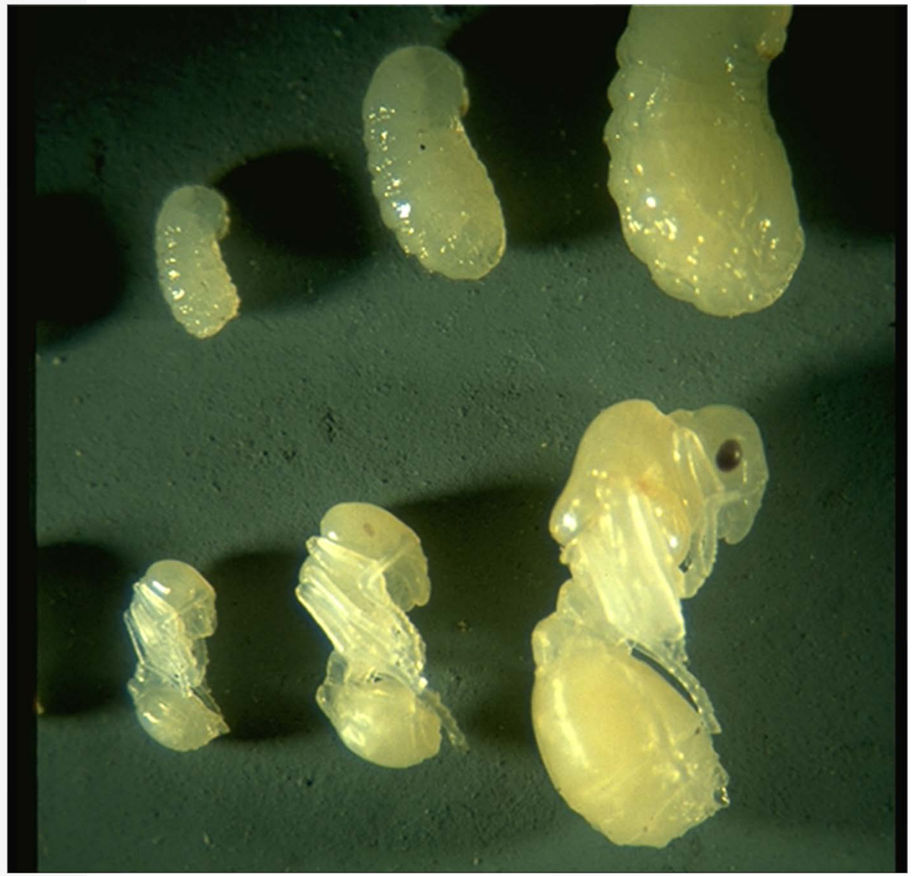
Can be easily ruined

- Wet, too hot, sunlight

May not have immediate results

Types of Baits

- Fast Acting
  - Kills workers and queens
  - Faster acti
- Insect Growth Regulator
  - Mimic insect hormones
  - Prevents queen from laying viable eggs
  - Induces a deadly molt
  - Very slow acting



Types of Baits

Nervous System

- Abamectin
- Indoxocarb
- Spinosad
- Fipronil

Metabolism

- Hydromethylnon

Stomach

- Boric acid

Types of Baits

- Insect Growth Regulators
  - Fenoxycarb
    - Award
  - Methoprene
    - Extinguish
  - Pyriproxifen
    - Esteem
    - Distance

Baits – Toxin/IGR Blend
“Hopper Blend”

- Longer residual
- Quick acting
- IGR + Fast Acting
- Methoprene + Hydromethylnon

Bait Application

- Read the label for rates
- Apply fresh bait
- No rain within 48-hour window
- Apply when ant actively foraging for food
  - 75ºF

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Products - Baits

Baits AG & Urban	**Amdro Pro –** hydramethylnon	**Altrevin -** metaflumizone	**Clinch –** abamectin	**Esteem –** pyriproxyfen	**Esteem “Skip Swath” –** Texas Only
	Esteem + Amdro Pro Hopper Blend – Texas Only	**Extinguish –** methoprene	**Extinguish + Amdro Pro Hopper Blend**	**Extinguish Plus –** s-methoprene & hydramethylnon	

Community Wide Fire Ant Programs

- Work with neighbors, street, entire neighborhood to treat at same time
  - Ensures better results, longer control
  - Increases natural enemies
  - Decreases fire ant activity
  - Price per treatment decreases

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House Flies

House Flies

- 4-7 mm, gray fly with 4 stripes
- Filth breeder
- Do not bite
- Annoy cattle and humans
- Reduce milk production
- Minimum development time 7-10 days (7-21 days)
- Harbors over 200 different pathogens

Sticky House Fly Traps

- Revenge Sticky Fly Tape
  - 1300’ tape refill with mounting hardware
  - Unwind fresh length when full of flies
- EZ Trap
  - Rain-proof
  - 3 X more trapping surface
- Revenge Jumbo Fly Catcher
  - 8” x 8”
  - Indoor use, hang anywhere at any length
  - Last 12 weeks
- Ortho Home defense fly bait decal
  - Window, 2 pack

Premise Products – Pheromone Traps

- Fly Terminator Pro - $26-30
- Captivator – $16-20
- Trap N Toss - $6-9
- Fly Relief - $5-6
- Others…

Bait Products

Golden Malrin - $50-$65 / 10 lbs

Maxforce granular - $43-$50 / 5 lbs

QuickBayt - $42-$50 / 5 lbs

QuikStrike - $40-$50 / 5 lbs

BASF Alpine Pressurized Fly bait - $27

Cyanarox - $65-$74 / 4 lbs

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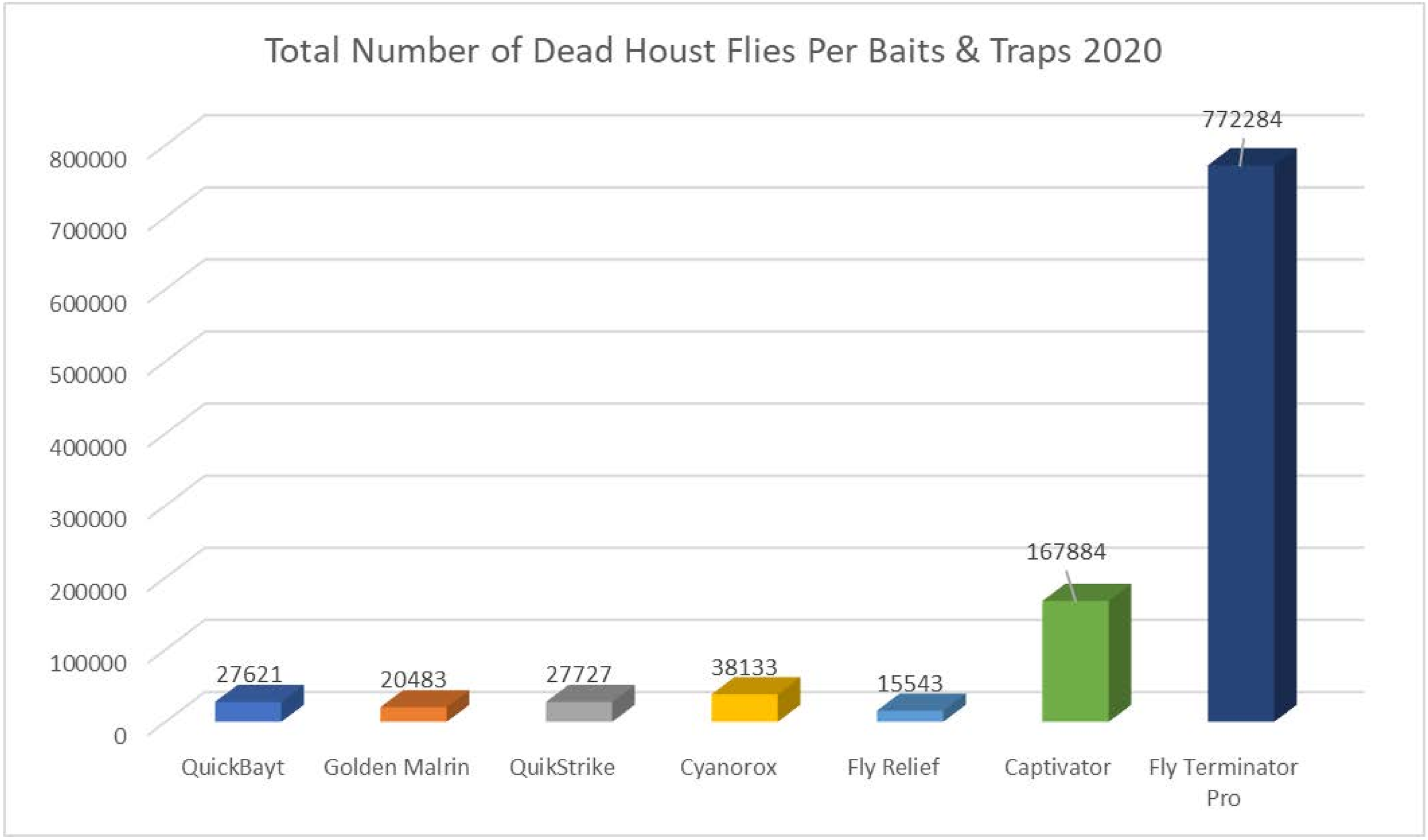
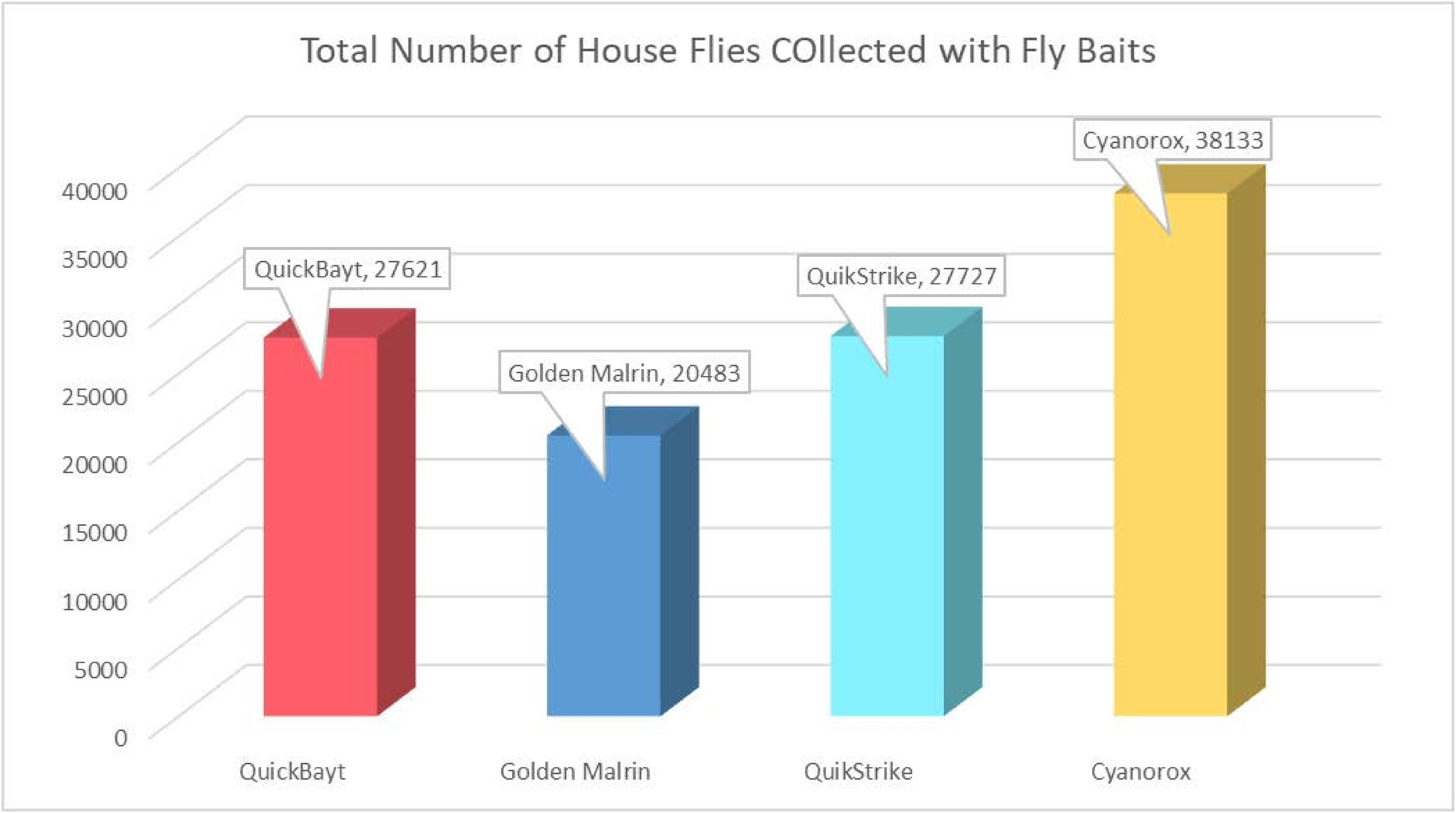
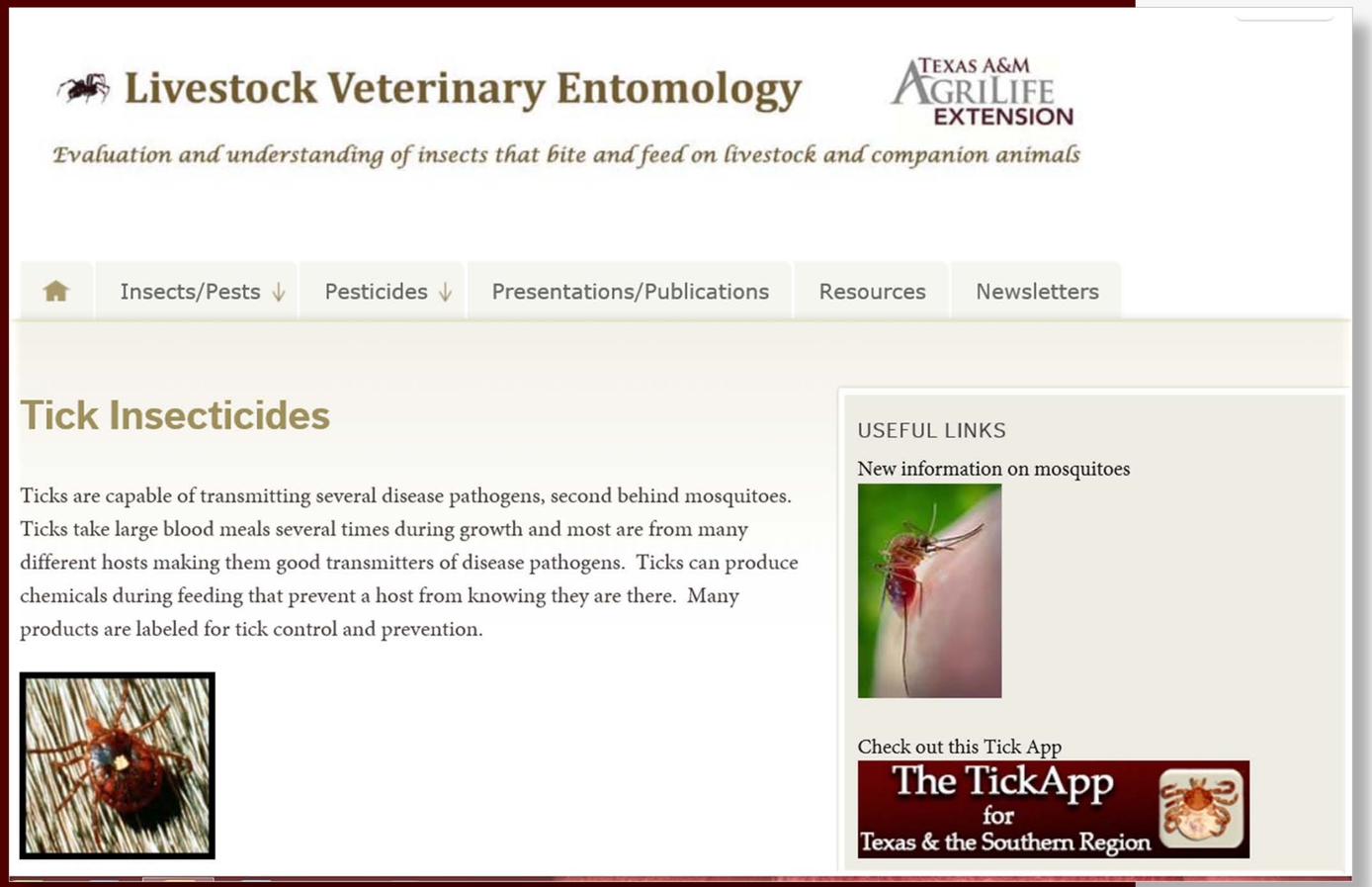

Total Number of Dead Houst Flies Per Baits & Traps 2020
800000
700000
600000
500000
400000
300000
200000
100000
0
27621
20483
27727
38133
15543
167884
772284
QuickBayt
Golden Malrin
QuikStrike
Cyanorox
Fly Relief
Captivator
Fly Terminator Pro


Total Number of House Flies COllected with Fly Baits
40000
35000
30000
25000
20000
15000
10000
5000
0
QuickBayt, 27621
Golden Malrin, 20483
QuikStrike, 27727
Cyanorox, 38133
QuickBayt
Golden Malrin
QuikStrike
Cyanorox

Thank you!

Love to talk about
all kinds of Insects.



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