Managing Crane Flies on Turf

“Days of Education”
Slovenia Turf Conference
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Dr. Pat Vittum
University of Massachusetts
Crane Flies
(leatherjackets)
Tipula paludosa
European crane fly

Tipula oleracea
“common” (or marsh) crane fly
Tipula paludosa

One generation per year

Most damage in spring

Photo: earthtechor.com
Tipula oleracea

Two generations per year

Most damage in autumn (fall)

Photo: C. Bramhall
Adult female

Photo: Dan Peck
Crane fly damage

Larvae feed on golf course turf, sports fields, lawns, and pastures

Photo: YouTube
Small larvae feed below the surface - attack roots, root hairs, and crowns.
Crane fly damage – large larvae

Migrate to surface, cause mechanical damage

Feed on stems, grass blades, and leaves above ground

Photo: michiganlawnfertilizing.com
Damage to putting green

Photo: Dan Peck
Crane fly larvae

Photo: B. Kantwell
What do they look like?
Crane fly eggs
Crane fly larvae
Crane fly larva
Crane fly larvae
Crane fly pupa
(“leatherjacket”)
Adult female

Photo: Dan Peck
**T. paludosa** life cycle (A)

- One generation per year
- Adults fly in late summer
- Females lay most eggs the first night
- Eggs hatch in 10 to 14 days
**T. paludosa** life cycle (B)

- 4 larval stages
- 1\textsuperscript{st} instar – 1 month
- 2\textsuperscript{nd} instar – 1 month
- Winter months – 3\textsuperscript{rd} instar, feeding under snow cover
- 4\textsuperscript{th} instar in early spring, grow rapidly (most damage)
T. paludosa life cycle (D)

- Larvae are inactive during summer months
- Pupate at end of summer
- New adults emerge in late August or early September
Life cycle

Tipula paludosa

Larva

Egg

Adult

Pupa

Not active

Jan    Feb    Mar    Apr    May    Jun    Jul    Aug    Sept    Oct    Nov    Dec

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T. paludosa notes

- Most oviposition is completed by dawn of first night of flight
- Females with eggs are too heavy to fly
- Spreads relatively slowly
- Newly laid eggs need nearly saturated environment
- Overwinter as third instars (which can feed throughout the winter)
T. oleracea life cycle (A)

• Two generations per year
• Adults fly in late summer, females can fly some distance
• Females spread egg-laying over several days
• Eggs hatch in 7 days
T. oleracea life cycle (B)

- 4 larval stages
- 1\textsuperscript{st} instar – 3 weeks
- 2\textsuperscript{nd} instar – 3 weeks
- 3\textsuperscript{rd} instar – 4 weeks
- Spend winter as 4\textsuperscript{th} instar, feeding under snow
- Cause most damage in fall and winter
**T. oleracea** life cycle (C)

- Pupate in late March to late April
- New adults active in late April or May
- Lay eggs
T. Oleracea life cycle (D)

- Larvae feed through the summer months
- Complete development in mid to late August
- Pupate (same time as T. paludosa)
- New adults emerge in September

Northeastipm
**T. oleracea**
(common crane fly)

- Two generations per year (adults fly in late April to mid May and again in late August to mid September)
  - Larvae can cause damage in summer
- Females can fly some, spread egg-laying over several days
- More “mobile” than *T. paludosa*
Life cycle

Tipula paludosa
Larva
Egg
Adult
Pupa

Tipula oleracea
Larva
Egg
Adult
Pupa
Larvae
Larva
Pupa

Not active

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Monitoring techniques

• Adults
  – Sweep nets

• Larvae
  – Soil sample
  – Spread a tarp overnight (Wimbledon)
  – Can flush them to surface very effectively with carbaryl (Sevin™)
Crane fly

Both species survive best when soils are very wet when eggs are laid and when larvae hatch.

Photo: B. Kantwell
Cultural strategies – crane flies

Allow top layer of soil to dry out in late summer and early fall (when females are laying eggs)

Do not over-irrigate in late summer and early fall (or in late April and May for *T. oleracea*)
Cultural strategies – crane flies

Improve drainage (avoid long-standing moisture)

Avoid thick or dense thatch
Biological control – nematodes

*Steinernema feltiae* reduced populations 55% if applied when larvae were small (November or early spring)

*Heterorhabditis bacteriophora* has not been tested

Gwen Stahnke, Washington State University
Biological control – bacteria

*Bacillus thuringiensis israeliensis* reduced populations by 55% if applied when larvae were small (November or early spring)

*Bacillus thuringiensis kurstaki* has not been tested

Gwen Stahnke, Washington State
For those countries where it is legal:

bifenthrin – especially when larvae are small (October or November)
Must be watered in
Questions ????

pvittum@umass.edu