Mites on warm-season turfgrasses: Australian research update

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Outline of presentation

- Brief introduction to the research project
- Overview of Acari (mites & ticks)
- Turfgrass feeding mites in the literature
- Symptoms and mites identified on turfgrasses in Australia
- Where to from here?

TU10002: Mite damage – a survey on four warm-season turfgrasses

- Research project funded by Horticulture Australia Ltd
  - Funding comes from compulsory turf levy paid by sod growers with matching funds from the Australian government
- Project leader: Peter McLaugh (NSW)
- Team members:
  - Dr Don Loch (Queensland)
  - Dr Chris Lambrides (Queensland)
  - David Nickson (Victoria)
  - Danuta Knihinicki (Industry & Investment NSW)

Acari (mites & ticks)

- Second most diverse animal group
  - >55,000 described species worldwide
  - Total diversity estimated at >1,000,000 species
- Ubiquitous
  - Found in every major ecosystem on earth
  - Amazing diversity of habitat (e.g., geothermal springs, human hair follicles)
  - Plant, animal & insect parasites, predatory mites, fungal & dust mites
  - Vectors of disease, producers of allergens
  - Biological control agents for weeds (include very host-specific species)
- Tiny
  - Mostly <1 mm in length as adults (many <0.25 mm)
  - Omnivorous, yet often invisible to the naked eye
  - People often unaware of their presence and the damage done by mites

Sample locations and symptoms

- Cynodon dactylon & hybrids
- Stenotaphrum secundatum
- Pennisetum clandestinum
- Zoysia spp.
- Other grasses as appropriate

Record GPS location and symptoms (description & photographs)

Extraction & identification by Danuta Knihinicki
(acarologist specializing in taxonomy of plant-feeding mites and their predators)
What is a mite?

- Arachnida
  - Spiders, mites, ticks, scorpions, whipscorpions, pseudoscorpions
- Mites distinguished from spiders by body shape
  - Spiders have 2 distinct segments (cephalothorax and abdomen)
  - Mites lack segmentation (cephalothorax and abdomen fused into one)

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Turfgrass feeding mites in the literature

- Grass-webbing mites (Family Tetranychidae)
  - Oligonychus uranellus, O. digitatus
  - Not host specific
  - Occasionally affect turf & pasture grasses during hot dry weather

- False spider mites (Family Tenuipalpidae)
  - Not host specific
  - Not as host-specific as the Eriophyidae

Survey results – *Cynodon dactylon, Cynodon hybrids*

- *Aceria* species
  - Queensland, NEW, WA

Survey results – *Cynodon dactylon, Cynodon hybrids*

- *Eriophyid* mites (Family Eriophyidae)
  - Highly host specific
  - Microscopic mites with elongated worm-like bodies, 4 legs (2 pairs)
  - *Aceria* species
    - *A. zoysi* (galled shoots on native (distorted rosettes ["witches brooming"] on (distorted terminal shoots & leaves on *C. dactylon*)
    - *Dolichotetranychus* australi (*D. australi*, *D. summieri*)
    - Queensland, NSW, Victoria, WA
    - *D. micidus* (*D. micidus*, *D. mullenbergi*)
    - *D. salinas*, *D. cracens*, *D. carnea* (on *Z. zoysi*)
    - *D. zoysi* (on *Z. minima*)
- *False spider mites (Family Tenuipalpidae)*
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- Turfgrass feeding mites in the literature
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Survey results – *Pennisetum clandestinum*

- **Dolichotetranychus species**
  - Queensland, NSW, ACT, Victoria, WA

Survey results – *Zoysia japonica*, *Z. matrella*, *Z. pacifica*

- **Aceria zoysiae**
  - Probably not present
  - “Buggy-whip” symptoms (US publications) not seen in Australia

Photos: Dr Aaron Patton

Survey results – *Digitaria didactyla*

- **Dolichotetranychus species**
  - WA
  - Symptoms less obvious (poor root development, poor growth)

Where to from here? The way forward

- Detailed studies of life cycles & ecology
  - Post-graduate student research
- Possible relationship to secondary disease organisms
  - e.g. summer decline in Cynodon greens
- Alternate hosts
  - Other introduced and native grasses (e.g. *Sporobolus virginicus*)
Where to from here?
The way forward

- Detailed studies of life cycles & ecology (including predators)
  - Post-graduate student research
- Possible relationship to secondary disease organisms
  - e.g. summer decline in Cynodon greens
- Alternate hosts
  - Other introduced and native grasses
- Effective control measures
  - Partially mask effects of mites with water and N
  - Repeat sprays with adulticide+ovicide to break life cycle
  - New chemistry?
- Increase industry awareness of problems & management
  - Sod producers, facility managers, etc.

The fairies at the bottom of the garden

- Turfgrass feeding mites
  - Imaginary or real?
  - Real!!!
  - 3 different groups found on 8 different turfgrass taxa
  - Cause a lot of unsuspected damage
    - Harvest-ready sod takes longer to grow in
      - Turf managers need time and harvested turf
      - Slower growing, less wear & drought tolerant for turf managers
      - Slower turnaround for sod producers
      - Higher water & N use for turf managers
      - Inclusion of expensive unnecessary “water-saving” products

The fairies at the bottom of the garden