

Broad Mites in Caneberries and a New Invasive Alert

North American Raspberry and Blackberry Association 2016

Douglas G. Pfeiffer
205C Price Hall, Virginia Tech
Blacksburg VA 24061
540-231-4183, dgpfeiff@vt.edu

Broad mite, *Polyphagotarsonemus latus* (Banks)



Broad mite, *Polyphagotarsonemus latus* (Banks)

Tarsonemidae

Most mites in this family feed only on fungi

Only three genera adapted to feed on higher plants:

Tarsonemus (incl white-tailed mite)

Steneotarsonemus (incl cyclamen mite)

Polyphagostarsonemus (incl broad mite)



Broad mite, *Polyphagotarsonemus latus* (Banks)

Widespread, mainly tropical

In temperate zones, more common in
greenhouses

Polyphagous – many ag crop, ornamental, and
wild hosts

In recent years, reports from caneberries, in
field and in tunnels

Reductions in yield



Broad mite increasing in abundance?

Reports from Arkansas, Illinois, Indiana,
Maryland, North Carolina, South Carolina,
Pennsylvania and Virginia



Broad mite, Family traits...

Tarsonemidae

Pronounced sexual dimorphism

Size differ, with different conformation

Female – oval, convex, have trachea

Male – smaller, with genital papilla, no trachea.

Fourth pair of legs accessory copulatory structures



Broad mite life cycle

Four life stages:

Egg

Larva

Nymph

Adult

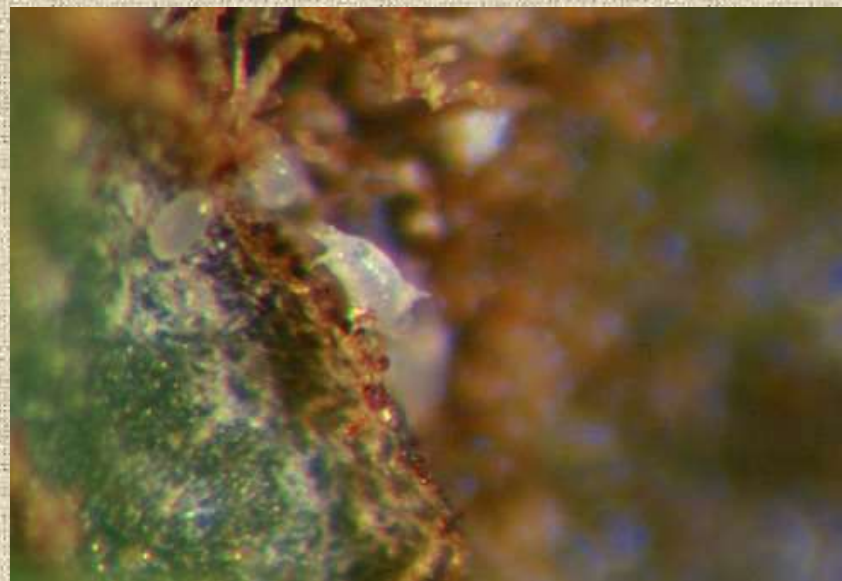


Broad mite life cycle

Four life stages:

Egg – oval, elongate, longitudinal rows of tubercles, begin to appear late May. Note white bumps

Larva



Broad mite life cycle

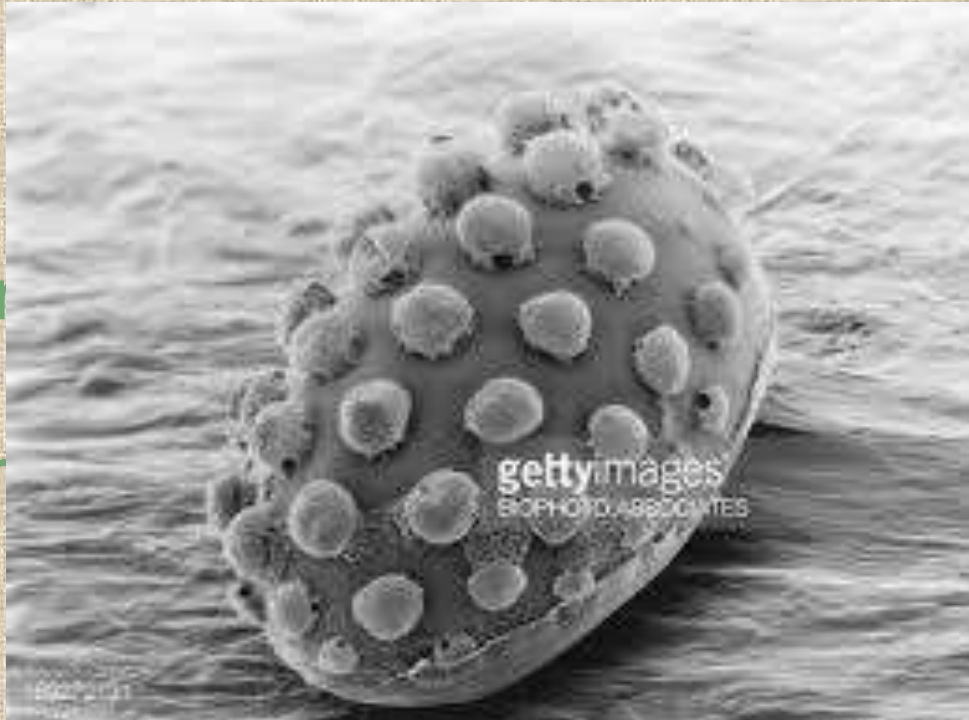
Four life stages:

Egg – oval, elongate, longitudinal rows of tubercles, begin to appear late May. Note white bumps

Larva

Nymph – 1

Adult – lar



Broad mite life cycle

Four life stages:

Egg

Larva – 6 legs, otherwise resembles adult. Feed for 2-3 d, become quiescent.

Nymph

Adult.



Broad mite life cycle

Four life stages:

Egg

Larva

Nymph – remains within skin of quiescent larva (pupa).
Becomes attractive to males, who pick them up.

Adult



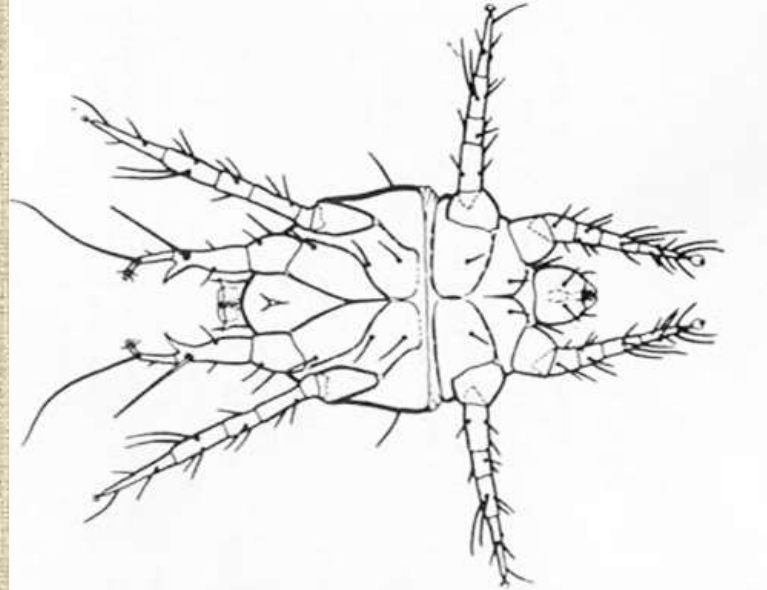
Broad mite life cycle

Four life stages:

Egg

Larva

Nymph



UFla

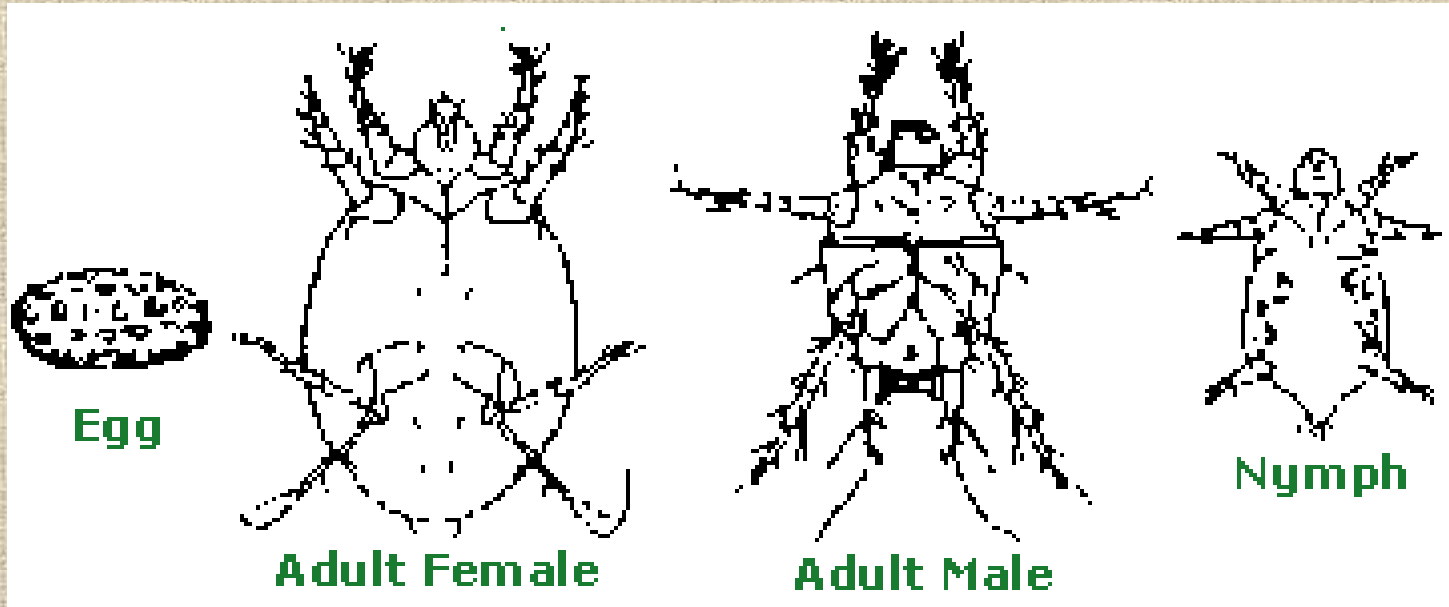
Adult – large, oval, color depends on food source.

Males live 5-9 d, females 8-13 d





Broad mite life cycle



NCSU

Mating behavior

Male carries female pupa and adult on his back, using fourth pair of legs and anal papilla (sucker-like organ)

Disperses to fresh foliage

Mates on female eclosion

30-76 eggs over 8-13 d



Male carrying inactive female nymph (USDA)

Mating behavior

Fertilized eggs give rise to females,
unfertilized eggs to males



Male carrying inactive female nymph (USDA)

Tetranychidae



Pfeiffer

Broad mite life cycle

- Multiplies rapidly
 - 4-5 days/generation in summer
 - 7-10 days/generation in winter
- Egg production
 - 3-4 eggs per day in summer
 - decreases in winter



Broad mite dispersal

Generally do not wander from leaves

When leaves age, will disperse

Apparently by males carrying females



Broad mite dispersal

Phoresy – may hitchhike on whiteflies and other insects



Broad mite life cycle

Optimum conditions:

Warmth

High humidity

Low light intensity



Can survive freezing

Sensitive to temps $> 95^{\circ}\text{F}$ (35°C)

First eggs and mites appeared mid-April (Ar)

First males seen mid June

Broad mite host interactions

Mouthparts:

Chelicerae simple, styliform, only slightly eversible

Best suited for soft host material (young leaves)

Toxic saliva



Broad mite host interactions

Feed almost entirely on lower leaf surfaces

Leaves become rigid, rolled under at edges

Confined to young leaves or flower parts

Leaves may split and crack, become ragged



Broad mite host interactions

Symptoms on caneberries (Arkansas and Pennsylvania)



D. Johnson UArk

Broad mite host interactions

Symptoms on caneberries (Arkansas and Pennsylvania)



K. Demchak PSU

Broad mite host interactions

Symptoms on caneberries (Arkansas and Pennsylvania)



D. Johnson UArk

Broad mite management

Physical control – respond to warm water treatment

Soak plant in water at 105-110° for 15-45 minutes

Hard to do for caneberries in the field!

More applicable to potted ornamentals

Broad mite management

Cultural control:

Keep plants healthy

Remove symptomatic plants, neighbors

Maintain weed control

Pruning effects?



Broad mite management

Biological Control:

Neoseiulus andersoni

Neoseiulus barkeri

Neoseiulus californicus

Neoseiulus cucumeris

Neoseiulus swirskii



Broad mite management

Chemical control – larvae and adults respond to sulfur (2-3 applications at 5-day intervals)



Table 1. Acaricides labeled for broad mite control on caneberries.

Miticide		MOA	Egg	Adult
bifenthrin	Brigade	3	No	Yes
propargite	Omite	12C	No	Yes nonbearing only
acequinocyl?	Kanemite?	20B	Yes	Yes
pyridaben	Nexter	21	No	Yes postharvest only
dormant oil	oil	M	Yes	Yes
summer oil	oil	M	Yes	Yes
neem oil extract	Trilogy	M	Yes	Yes

Effective but not registered on caneberries:

- abamectin (Agri-Mek, Avid)
- fenproximate (Akari, Portal)
- spirotetramat (Movento)
- spiromesifen (Judo, Oberon)
- lambda-cyhalothrin (Warrior)
- tolfenpyrad (Apta)

Spotted lanternfly, *Lycorma delicatula*



USDA

Spotted lanternfly, *Lycorma delicatula*



Pfeiffer

Spotted lanternfly, *Lycorma delicatula*

- Nymphs black with white spots in instars 1-3, then red with black spots later in instar 4.



USDA

Questions?

Request for grower observations

dgpfeiff@vt.edu in Virginia

