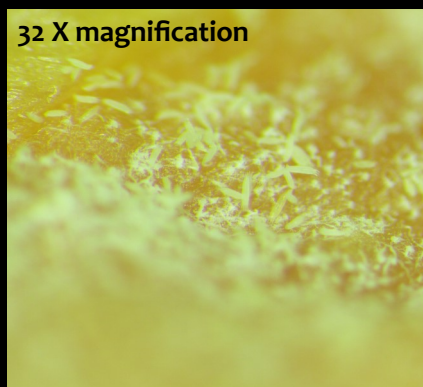


Eriophyid Mites: Micro-Scourge of Garlic

We've been getting a lot of calls from growers remarking that their garlic just isn't holding up the way it should this season. Cloves are drying out and discoloring much earlier than would be expected. Dr. Frank Hay at the Geneva Experiment station popped some of this suspect garlic under a microscope and found some very unwelcomed visitors: Eriophyid mites. These mites are small. I mean really small. Hugely small! Invisible to the naked eye, and unrecognizable under a hand lens. Only at 32x magnification do we start to see them clearly, but honestly you might not want to. I will show you anyway:



Yikes! This was not what I was expecting to see on the surface of those desiccated cloves. Yet as I started digging with the help of our dedicated entomologists, it became clear that this is an issue we as an industry have been dealing with for a while. We may not have been seeing the mites, but we have been seeing their symptoms, and writing them off as poorly cured garlic in storage and as environmental stress/viruses in the field.

Examination of the symptoms:

Garlic can degrade in storage for a variety of reasons. Poor post-harvest handling, sub-optimal storage conditions (too warm, too wet, etc), and high disease pressure can all play roles in garlic storing poorly. To determine which of these issues affects your garlic, peel 10-15 cloves and examine them closely. One way to differentiate mite damage from other issues, particularly if you are having issues shortly after garlic enters storage, is to look for a dull surface to cloves as opposed to a shiny surface. The mites rasp at the surface of the clove, and are themselves dusty looking on the surface. From here, find the highest magnification hand lens you can to look at the surface, and look for what look like very, very small thrips. Or you can send samples to the diagnostic clinic to have the presence or absence of mites verified.

In the field, mite damage can be seen early in the growing season as stunted, twisted growth with streaking (Lange and Mann, 1960). Notably, the plants tend to out-grow this damage. The first few leaves may emerge stunted and twisted, but later growth may appear fine.

Control Measures:

There are two methods of control of Eriophyid mites which show promise. The first, which comes from Oregon State (Jepson and Putnam, 2008), is to soak seed stock for 24 hours immediately prior to planting in a 2% soap and 2% mineral oil water bath. I'd recommend this as a control if you detect an issue prior to planting, but after drying the garlic.

A second control measure is heating the garlic to between 113° and 119° F briefly during the drying process. At 113° mite eggs are killed within an hour (Courtin et al, 2000). This process should be done with great attention to prevent bulbs reaching the temperature of 120°, at which point waxy breakdown occurs. Bringing garlic to this temperature while monitoring the crop, then dropping back to between 100° and 110° for the remainder of drying should yield good control and maintain crop quality. Check for mites before putting the garlic into storage, to determine storage protocol.

If mites are detected in garlic which is being kept for consumption rather than planting, the best method to stop population increase is to store the garlic cold. Maximum population growth occurs at 77° and 80-95% RH (note, this temperature would be considered fine for most other storage considerations, so if you have a mite issue, storage as usual will not work). As the temperature drops from here, reproduction slows, stopping at 43°. Hence, a moderate infestation could be held static by storing garlic at 43° or lower. If you store cool to cold, remember that the garlic is being vernalized, and will sprout if brought to warmer temperatures. Keep it cold until its being sold or distributed.

Additional best practices can help to reduce mite pressure over time. Mites may reside in the soil, so make sure to practice crop rotation (as a general rule a 3 year rotation is good; 4 is better). Periods of field saturation can greatly reduce mite numbers, so the wet fall and winters we have been having could actually play in our favor.

This pest will be receiving additional attention over the coming years, with more control recommendations being evaluated, including rotations and chemical controls (organic and conventional), as well as biocontrols. When considering chemical controls, remember this is a mite, not an insect, and that acaricides, not insecticides, will be most effective. That said, at this point there do not appear to be any acaricides labeled for eriophyid mite control in garlic in New York that this time.

What is an eriophyid mite, anyway?

It turns out that if you are confused by mites, you aren't alone. Some garlic growers have heard of wheat curl mite in the past (*A. tosichella*) and now we are adding in dry bulb mite (*A. tulipae*) as another worry. The two have been confused by entomologists for years, and the differences are still being teased out (Skoraka et al, 2013). Notably, there is still work needed to understand which mites will feed on garlic and other alliums, and to what extent.

One key difference to be aware of, however, is that eriophyid mites are different from bulb mites. Bulb mites feed primarily on damaged or decaying tissue, while eriophyid mites will feed on healthy tissue.



For more information on this or other garlic issues, visit our website at <http://enych.cce.cornell.edu> and click on the garlic icon or email me at cls263@cornell.edu. -Crystal Stewart

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