

Spruce Spider Mite

Oligonychus ununguis (Jacobi)

Acari: Tetranychidae

Richmond, D. S.; Shetlar, D. J. 1996. Eclosion time and spatial distribution of overwintering spruce spider mite (Acari: Tetranychidae) eggs on Colorado spruce. *Journal of Economic Entomology* 89: 447-452.

Objectives: To develop a degree-day model for the eclosion of diapausing *O. ununguis* eggs; to determine the spatial distribution of eggs on Colorado spruce, *Picea pungens*.

Abstract: The spruce spider mite, *Oligonychus ununguis* (Jacobi), can be a significant pest of field, nursery, and greenhouse-grown plants. Coniferous hosts include Fraser fir [*Abies fraseri* (Pursh)], pines (*Pinus* spp.), junipers (*Juniperus* spp.), and several spruces (*Picea* spp.). Risk of mite damage is especially high during periods of drought and high temperatures. Under these conditions, mite populations build quickly and can cause serious damage. Infested needles are stippled and covered with webbing; eventually they turn brown and fall prematurely from infested trees. Growth loss and mortality may follow. Ornamental nursery crops are particularly susceptible to aesthetic damage by *O. ununguis* and even low mite densities can result in economic loss. Pest managers would benefit from being able to time chemical applications for *O. ununguis* with the eclosion of winter-diapausing eggs, or direct applications to areas where eggs are laid rather than treating the entire plant.

Research conducted on Colorado spruce, *Picea pungens* Engelmann, in Ohio indicated that 50% of overwintering eggs of *O. ununguis* hatched at approximately 170 degree-days (DD) measured using a base temperature of 5.6°C beginning March 1, and growers should treat the first generation around 258DD when eclosion reaches 100%. A study of the spatial distribution of overwintering eggs showed that numerically greater numbers of *O. ununguis* eggs were found in the mid-crown level but no eggs were found on the trunks.

On south- and east-facing sides of Colorado spruce, significantly greater numbers of eggs were found on branch axes away from the trunk. On branches on the north- and west-facing sides, eggs were located closer to the trunk along branch axes. Mean egg location along branch axis also varied with crown level. Eggs were located farther away from the trunk on branches in the lower third of the crown as compared to branches in the middle and upper thirds. The spatial distribution of *O. ununguis* eggs likely reflects desiccation by prevailing winter winds.

Sampling Procedure: Monitor degree-day accumulation from March 1 using the base temperature of 5.6°C. Predict the percentage of eclosion by overwintering eggs using the formula:

$$\text{probit } Y = -28.64 + 6.59 \ln X$$

where X = the natural log of accumulated degree-days from base 5.6°C and Y = cumulative % eclosion in probits. Consider treating trees for first generation *O. ununguis* around 258DD from March 1. Make certain that sprays penetrate the foliage on the lower third of Colorado spruce, where eggs are laid on limbs close to the trunk on the east- and south-facing sides. Trunks do not require treatment.

Notes: These recommendations are derived from research conducted on Colorado spruce in Ohio and may not be applicable to other conifers or in other regions. Use these recommendations with caution until validated for other hosts and in other regions.