

Spruce Spider Mite

Oligonychus ununquis (Jacobi)

Acari: Tetranychidae

Webster, R. 1993. Sample collection method and sequential sampling plan for mites (*Oligonychus ununquis*) and aphids (*Cinaria laricifex*) on tamarack. Tech. Note No. 278. Forestry Canada, Maritimes Forest Research Center; 5 p.

Objective: To propose a fixed precision sequential sampling plan to determine the optimal number of samples needed to monitor populations of *O. ununquis* on larch.

Abstract: Spruce spider mite, *Oligonychus ununquis* (Jacobi), is a common pest of spruce, *Picea* spp., and other conifers. Infested needles are covered with webbing, turn yellow, and drop prematurely. High population densities may cause a loss of tree vigor. Infestations are a recurrent problem in seed orchards in New Brunswick.

A sequential sampling plan with fixed precision was developed for *O. ununquis* on larch, *Larix* spp. Depending on the desired level of precision, 4 to 50 trees need to be sampled using this plan. Known threshold levels can be applied to this sampling plan to determine how many branch samples are necessary to determine if control treatments are warranted. Counting up to 1,000 mites requires 10-15 minutes.

Sampling Procedure: Randomly select at least 25 larch trees in each stand being surveyed. Sample one branch per tree, beating each branch with a 60-cm long padded stick ten times in rapid succession to dislodge any *O. ununquis* present into a 30 x 20 x 8 cm container held under the branch. Wash the mites out of the collection container with 35-40 ml of Oudemans' solution (8.7 L of 70% alcohol, 0.5 L glycerine, 0.8 L glacial acetic acid to make 10 L of solution) and into a 50-ml screw cap vial. Oudemans' solution kills and preserves all mites in the sample with their appendages extended, allowing for identification at a later date.

Remove needles, large pieces of debris, and excess Oudemans' solution from the sample. Pour the remainder into a petri dish set on a 1 cm grid to facilitate counting. It takes about 2-4 minutes to prepare each sample for counting.

Referencing Fig. B, count the cumulative number of *O. ununquis* in each sample until the stop line is crossed for the desired level of sampling precision. A precision level of 0.25 is generally sufficient for most purposes. For higher levels of precision, more samples should be taken from >25 trees, especially if *O. ununquis* is present at low densities.

Note: This is a proposed sampling plan that still requires validation. Use with caution.

Figure

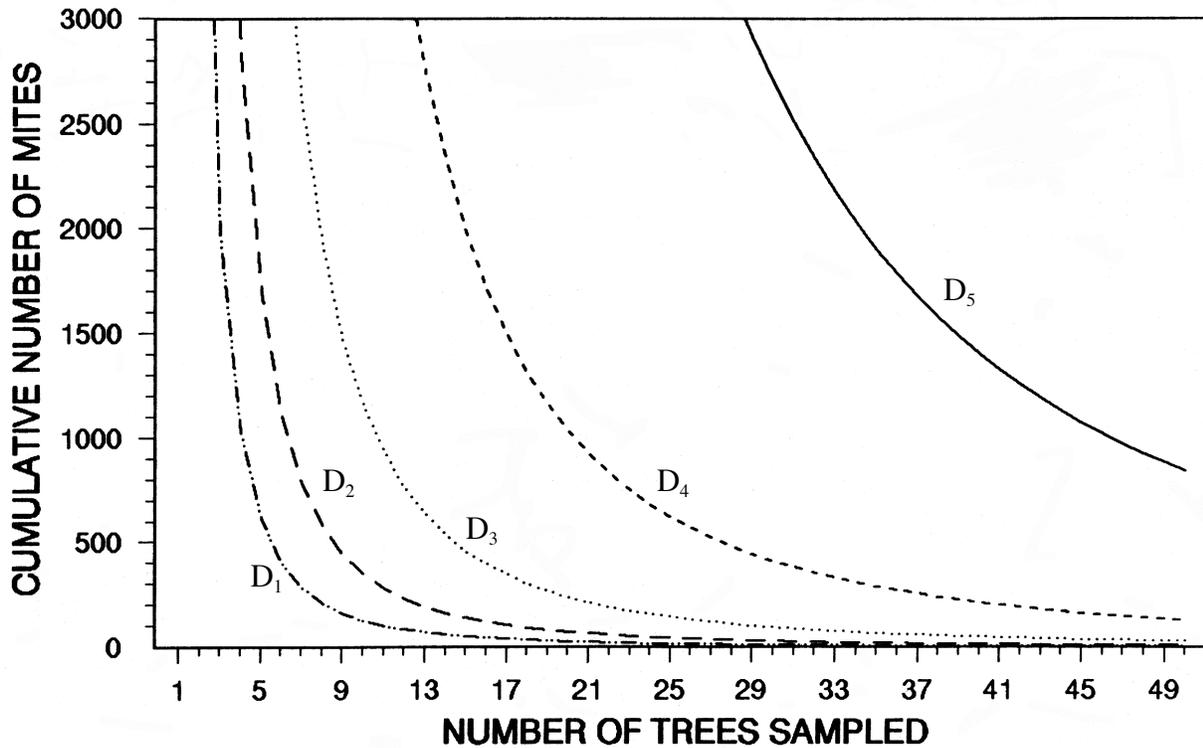


Figure A. Sequential sampling plan for *O. ununquus* on larch based on Taylor's power law. The sequential sample stop lines were calculated from the formula of Green (1970) based on the regression from Taylor's (1961) power law. Sequential sample stop lines are given for precision levels of $D_1 = 0.15$, $D_2 = 0.20$, $D_3 = 0.25$, $D_4 = 0.30$, and $D_5 = 0.35$.

Figure A reproduced with the permission of the Minister of Public Works and Government Services, granted April 14, 2009.