

Introduced Basswood Thrips

Thrips calcaratus Uzel

Thysanoptera: Thripidae

Werner, S. M.; Nordheim, E. V.; Raffa, K. F. 2004. Comparison of methods for sampling Thysanoptera on basswood (*Tilia americana* L.) trees in mixed northern hardwood deciduous forests. *Forest Ecology and Management* 201: 327-334.

Objective: To compare three methods of sampling *T. calcaratus* on basswood.

Abstract: Canopy insects can be sampled using a variety of techniques. Pole pruners are commonly used, but foliage can also be collected using a shotgun or tree climbers. These methods were used to sample the introduced basswood thrips, *Thrips calcaratus* Uzel, on American basswood, *Tilia americana* L. *Thrips calcaratus* is associated with defoliation and crown dieback on basswood in northern US forests (Raffa and Hall 1989). In general, research objectives, legal ramifications, economic costs, and logistics should all be considered when selecting a sampling method for foliage insects.

Each collection method (pole pruner, shotgun, and tree climber) had its advantages and disadvantages. A tree climber who bagged foliage samples before releasing them to the ground collected more thrips per sample numerically than the other methods, but bagging the samples was time-consuming and increased the per-hour cost of hiring a certified tree climber. Furthermore, the mean density of thrips per sample obtained by a tree climber who did not bag the samples before releasing them to the ground did not differ from the mean density of thrips obtained by using a pole pruner or a shotgun. The pole pruner or shotgun methods can sample multiple areas of the canopy in a shorter period of time compared to a tree climber, but pole pruners may not reach all sections of the canopy equally well and the use of a shotgun may not be permitted in certain areas. A tree climber may introduce bias in the selection of foliage samples, but it may be comparable to that introduced by someone using a pole pruner.

Samples of *T. calcaratus* collected by the tree climber were positively related to those collected using pole pruners for both adult ($r^2 = 0.73$; $P = 0.01$) and larval thrips ($r^2 = 0.71$; $P = 0.01$), whereas samples collected using a shotgun were not related to samples collected by either a tree climber or a pole pruner. Densities of adult *T. calcaratus* obtained by the pole pruner method can be used to predict densities obtained by the tree climber using the formula $y = 0.83x + 0.04$, where y = density of thrips obtained by pole pruner method and x = density of thrips obtained by tree climber method.

Sampling Procedure: The sample unit consists of the three terminal leaves or leaf buds on each small basswood branch. Bag each sample separately for transportation back to the laboratory. Place each sample in 70% ethanol and collect the thrips present onto filter paper using vacuum filtration. Identify the species and life stage of the thrips under magnification.

Collect foliage samples from basswood trees using one of the following techniques:

1. Use a 1.83 m pole pruner to cut small branches from the canopy. Use 1.83 m pole extensions as needed.
2. Use a 20-gauge (15.90 mm bore diameter) shotgun to blast small branches from the canopy.
3. Hire a certified tree climber to climb trees, clip small branches, and either drop the branches to the ground or bag each branch separately before dropping them to the ground.

Thrips densities obtained by the tree climber or pole pruner methods are highly correlated and one can be used to predict the results of the other method. Use the following equation:

$$y = 0.83x + 0.04$$

where y = density of adult *T. calcaratus* obtained by pole pruner method and x = density of adult *T. calcaratus* obtained by tree climber method.

For *T. calcaratus* larvae, use the following equation:

$$y = 0.56x + 0.74$$

where y = density of larval thrips obtained by pole pruner method and x = density of larval thrips obtained by tree climber method.

Notes: Eight basswood trees were sampled using each method, but the authors did not specify the number of samples taken from each tree. Contact the authors for additional information.

Reference:

Raffa, K. F.; Hall, D. J. 1989. *Thrips calcaratus* Uzel (Thysanoptera: Thripidae), a new pest of basswood trees in the Lake States. Canadian Journal of Forest Research 18: 1661-1662.