

Cranberry White Grub

Phyllophaga anxia (LeConte)

Coleoptera: Scarabaeidae

Williamson, R. C. 2004. White grub (Coleoptera: Scarabaeidae) population density in relation to root damage to Fraser fir seedlings in transplant beds. *Journal of Environmental Horticulture* 22: 85-87.

Objective: To develop a damage threshold for *P. anxia* by relating larval density to root damage and seedling weight of Fraser fir, *Abies fraseri* (Pursh) Poir.

Abstract: White grubs (*Phyllophaga* spp.) are a widespread pest of the roots of many species of vascular plants. Larvae chew and girdle roots, impairing growth rates and easily killing plants. More specifically, cranberry white grub, *Phyllophaga anxia* (LeConte), is a pest of Christmas tree nursery stock in transplant beds.

Damage by second instar *P. anxia* on Fraser fir was investigated by experimentally manipulating densities of grubs and measuring the effect of increasing larval densities on root damage and plant weight. A density of approximately 31 larvae per m² (3-4 larvae per ft²) resulted in significant root damage and a 50% reduction in seedling weight. Controls were recommended if the density of *P. anxia* larvae were at or above this threshold.

Sampling Procedure: Because this study manipulated grub densities experimentally, no details were given for a defined sample unit, the number of sample units to collect, or a specific procedure to collect them. The methodology of Ives and Warren (1965) for sampling white grubs (*Phyllophaga* spp.) could be used for this purpose. Briefly, remove all soil in a 30 by 30 cm surface area to the depth of 10 cm (a total volume of 9,000 cm³) from the transplant bed. Pass portions of this soil sample one at a time through a screen to collect the grubs. Multiple samples of 9,000 cm³ soil each should be taken from different areas of the transplant bed. Tally the cumulative number of white grubs found in all the soil samples and calculate the larval density per m² based on the total area sampled. Control is warranted if the density of white grubs averages 31 larvae or more per m² in a transplant bed.

Notes: Although *P. anxia* larvae were used specifically in this study, the author suggests that this threshold is useful for any *Phyllophaga* spp. larvae. Ives and Warren (1965) recommended including all white grubs found in the soil samples as the larvae are difficult to identify to species.

Reference:

* Ives, W. G. H.; Warren, G. L. 1965. Sequential sampling for white grubs. *Canadian Entomologist* 97: 596-604.