LIFE HISTORY AND DAMAGE OF *Nepytia janetae*, A WINTER-FEEDING GEOMETRID ON SPRUCE AND FIR

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Nepytia janetae Rindge (Lepidoptera: Geometridae) is a univoltine, winter-feeding looper with three- to four-year outbreaks. Autumn temperatures during the outbreak years were somewhat warmer than in the autumns of the previous 20 years. Starvation, parasitism by an Ichneumonid, infection by an unknown virus, and heavy rains during the egg-laying period may all have been factors contributing to *N. janetae* population collapse. This species was not known to cause damage until two outbreaks in 1996-1999 damaged over 4000 ha of mature spruce-fir forests at high elevations in Arizona. The host species Engelmann spruce, *Picea engelmannii* Parry (Pinaceae), and corkbark fir, *Abies lasiocarpa* var. *arizonica* (Merriam) Lemm. (Pinaceae), were equally susceptible, but were not defoliated at lower elevations. Other Pinaceae associated with defoliated host trees, Douglas-fir, *Pseudotsuga menziesii* (Mirb.) Franco, and southwestern white pine, *Pinus strobiformis* Engelm., were not defoliated. Within the outbreak areas, defoliation severity did not vary with tree species, tree size, plot species composition, or physiographic factors. Average plot defoliation and mortality was 74% and 76% in the defoliated area, respectively, and 7% and 4% outside the defoliated area in the Pinaleño Mountains. Average plot defoliation and mortality were much less severe in the defoliated area of the White Mountains, 32% and 5%, respectively. Defoliation increased tree susceptibility to spruce beetle, *Dendroctonus rufipennis* (Kirby) (Coleoptera: Scolytidae), and western balsam bark beetle, *Dryocoetes confusus* Swaine (Coleoptera: Scolytidae). Bark beetle populations increased rapidly in the defoliated areas, especially in the Pinaleño Mountains. Most tree mortality was from the combined effects of defoliation and bark beetle attack.