

# CAN ALIEN PLANTS SUPPORT GENERALIST INSECT HERBIVORES?

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## ABSTRACT

Rearing experiments were conducted to address two questions relevant to understanding how generalist lepidopteran herbivores interact with alien plants. We reared 10 yellow-striped armyworms (*Spodoptera ornithogalli*), luna moths (*Actias luna*), bagworms, (*Thyridopteryx ephemeraeformis*), and white-marked tussock moths (*Orgyia leucostigma*) from egg to 5th instar on the excised foliage of a variety of alien and native plant species in the laboratory, to determine the degree to which highly polyphagous lepidopteran herbivores are capable of surviving on the suite of alien plants naturalized near Delaware. These species were chosen because gravid females were easily collected, they represent four unrelated families, and they have exceptionally long host lists recorded in the literature. With few exceptions, all four generalists either quickly starved or grew at an ecologically hazardous rate on alien foliage. By the end of the experiment all 10 white-marked tussock moths died on 10 of the 20 alien plants tested; all bagworms died on 13 of the 16 alien plants tested; and

all luna moths died on 13 of the 15 alien plants tested. Armyworm performed slightly better, with only 2 of the 20 plants causing death of all the larvae; however on 18 of the 20 plants tested, biomass production was less than half of that obtained by the largest larvae. The data suggest that 1) alien plants are unlikely to produce as much generalist insect biomass as the native plants they replace; and 2) lepidoptera that qualify as generalists when host breadth is considered over their entire geographic range may express a far more specialized diet within local populations. Both of these conclusions support the hypothesis that alien plant invasions may seriously disrupt terrestrial food webs by reducing the insect biomass required by insectivores in higher trophic levels. The success of insectivorous vertebrates depends on heavily on the ability of insects to assimilate the energy produced by plants and turn it into insect biomass. Our results call into question the ability of even the most generalist of lepidopteran species to adequately perform that task on many alien plants.