

Preliminary Report on the Relative Suitability of *Quercus* Taxa for Gypsy Moth Larval Development 2007

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The gypsy moth is a major defoliator of a wide variety of wood plant species. Oaks (*Quercus* spp.) are preferred, and within the *Quercus* some are more preferred than others.

The goal of this study was to evaluate various *Quercus* taxa for their relative suitability for gypsy moth larval development with the hopes of identifying additional *Quercus* species that might be incorporated into existing oak breeding programs. Results from this study will hopefully contribute to the selection and development of oak species less preferred by the gypsy moth, and for use in forest plantings, the urban forest, and landscapes.

Materials and Methods

No-choice laboratory feeding bioassays were conducted on neonate gypsy moth larvae (May - July) during the 2007 growing season. Sixty-one (61) different *Quercus* taxa were evaluated. Common crabapple (*Malus* spp.) and bur oak (*Q. macrocarpa*), both favored hosts of gypsy moth larvae, served as standards. All candidate biotypes are growing at Starhill Forest Arboretum, near Springfield, IL.

Leaves for the laboratory bioassay tests were randomly collected from ground level from all four cardinal directions and held in cold storage in plastic bags at 5°C for a maximum of 2 d. Leaves collected from each test tree were combined for the laboratory bioassays. Because of the small size or limited number of some of the trees, only one tree per biotype was available for testing.

Gypsy moth larvae used in the no-choice study were field-collected from plant material at Lisle, IL during an egg mass survey conducted in December, 2006. Eggs masses were held in a refrigerator until May, 2007. In mid May, 2007, the egg masses were placed in clear plastic petri dishes and held in an incubator under a photoperiod of 16:8 (L:D)h at 25°C. Upon eclosion, approximately 10 gypsy moth (GM) larvae were placed into a 1 quart container along with foliage of a candidate biotype. The petioles of the foliage were placed into a water pick to insure freshness and turgidity. There was one (1) container (sub-replicates) for each tree for each biotype (total of 10 larvae per biotype). The containers were examined daily for larval mortality, evidence of feeding, pupation, and adult emergence. Foliage was replaced every 3 days or as needed. When all larvae had died or had pupated, study was completed.

Within 24 hours of pupation, fresh weights were taken to the nearest 0.01 gm. Pupae were then returned to the incubator until adult emergence occurred. Upon emergence, the adult moths were sexed and adult females and males reared on the

same host were placed into plastic one (1) quart cartons and allowed to mate. Cartons were observed daily for adult mortality and oviposition. Adult females were provided with a cotton wick dipped in a sugar solution.

The measure of suitability for larval development for each biotype was defined by mean number of days of longevity, mean number of days to pupation, and mean dried fecal pellet weights.

Results

Of the 61 biotypes tested in this study, no gypsy moth larvae (610 larvae) lived more than seven (7) days. In most cases, larvae died with 5-7 days of being placed on the foliage. In contrast, larvae feeding on *Q. macrocarpa* completed development, pupated, and emerged as adults. Approximately 70% of the larvae feeding on *Q. macrocarpa* completed development and emerged as adults.

Based on these very preliminary results, it appears that there are a number of *Quercus* biotypes that may be suitable for future breeding programs. Further studies are needed to better identify these species in the field under normal gypsy moth pressure.

Assistance for this study was provided by Guy Sternberg, owner, Starhill Forest Arboretum; and Julia Ossler, Lynnaun Johnson, Alana Cook, Kie Layne, and Audrey Masawi, students from Illinois College interning at Starhill Forest during 2007.



Audrey Masawi, Julia Ossler, Alana Cook, Lynnaun Johnson, Kie Layne, and Guy Sternberg collecting feeding specimens from some dwarf oaks at Starhill Forest Arboretum.
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