

MESOSCALE LANDSCAPE MODEL OF GYPSY MOTH PHENOLOGY

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ABSTRACT

A recently-developed high resolution climatological temperature data base was input into a gypsy moth phenology model. The high resolution data were created from a coupling of 30-year averages of station observations and digital elevation data. The resultant maximum and minimum temperatures have about a 1 km resolution which represents meteorologically the mesoscale.

The GMPHEN phenology model was used to simulate the seasonal development of gypsy moth. The model predicts the timing of male and female gypsy moth stages based on degree-day thresholds. As daily maximum and minimum temperatures are input into the GMPHEN model, the simulated insect population passes through a succession of phenological stages according to accumulated degree days.

Weekly averages of daily high resolution climatological maximum and minimum temperatures for two areas, one in western Pennsylvania and the other centered on West Virginia, were input into the GMPHEN model. The resulting model output were displayed as landscape maps overlaid with county boundaries. Beginning with January 1, the weekly landscape maps depict the average seasonal development of gypsy moth starting with egg and ending with the adult stage. By viewing the succession of maps, one can follow the progression of gypsy moth development both temporally and spatially. The series of maps provide a strategic tool for anticipating the seasonal date of a particular gypsy moth stage at a given location.