# Supplementary materials for the article “Modeling the spread of a mutation that allows native phytophagous insects to feed on an invasive plant”

**Mode 1. Panmictic mating**

(1) Logistical growth

, where are quantities of wild type, heterozygote and mutant genotypes on native plant species, respectively; () is population size of phytophage on the native plant;N is population size of the native plant, which also determines the carrying capacity of the respective herbivore population; are quantities of wild type, heterozygote and mutant genotypes on invasive plant species, respectively; () is population size of phytophage on the invasive plant;I is population size of the invasive plant, which also determines the carrying capacity of the respective herbivore population; f is a proxy for feeding efficiency (fitness) of a phytophage on the plant, for a wild type on invasive plant f1 is used which is lower than f.

(2) Migrations

, where m is a proportion of phytohages migrating to the other plant species, in base model m was 0.01, and 0.1 when modeling higher migrating rate.

1. Panmictic mating

(3.1) To model crosses, we first go to proportions of genotypes:

, where are proportions of genotypes

(3.2) Next, we calculate the allele frequencies:

, where and are wild type and mutant allele frequencies on the native plant; and are wild type and mutant allele frequencies on the invasive plant.

(3.3) Next, we calculate the frequencies of genotypes in the next generation after panmictic mating

(3.4) Then again we pass from the proportions of genotypes to the abundances

**Mode 2. Assortative mating**

In this mode only equations (3.3) changes: there we calculate the frequencies of genotypes in the next generation after assortative mating

**Mode 3. Asymmetric migrations rate.**

For modeling asymmetric migrations, with a higher migration rate of the mutant phenotype to the invasive species, which can be interpreted as a behavioral adaptation to the invasive plant, equations (2) were changed:

, where is higher than m and reflects a higher migration rate of mutant phenotype to the invasive plant.