

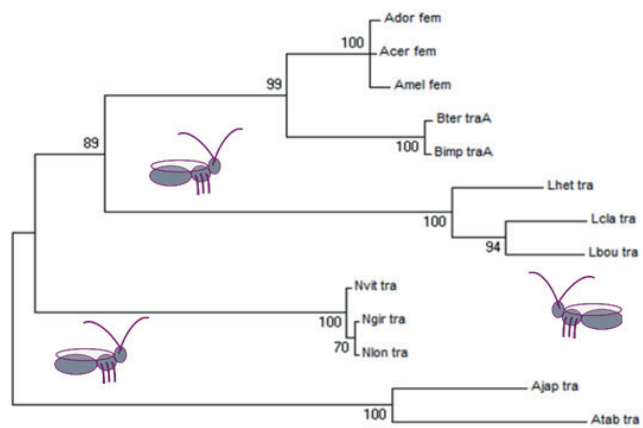
Evolution of sex determination genes

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The genetics of developmental pathways are presumed to be well conserved due to the functional necessity of these basic processes in any organism. One of these basic developmental processes is sex determination: the determination and differentiation of females and males. However, sex determination features a wide variety of fast evolving genes and mechanisms. Insects are an excellent group for studying this variation in sex determination mechanisms.

Some groups have male heterozygosity (XY or XO), others female heterozygosity (ZW or ZO) and yet others mechanisms without sex chromosomes (e.g. haplodiploidy). Two key features are consistently featured in the different sex determination mechanisms: sex is determined through 1.) a cascade of genes that are 2.) spliced in a sex-specific manner.



In recent years a wide range of (candidate) sex determination genes and splicing complex genes have been identified. Searches have focused on a small number of model species and economically important pests. The development of new sequencing techniques, however, now allows for a wider investigation of the genes underlying sex determination mechanisms. Large datasets have been collected in recent years covering most insect groups and exponentially increasing numbers of (both closely related and far-removed) species. This opens the possibility to answer questions such as: Are certain elements repeatedly recruited in the sex determination cascade? Does sequence divergence or loss of genes correlate with turnovers in sex determination mechanisms?

Methods: identify homologous sequences with BLAST and hidden Markov models, sequence alignment, phylogeny reconstruction.

Starting date: open