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## **Status of biocontrol research projects in North Dakota with special reference to *Aphthona* spp. and the gall midge, *Spurgia esula***

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The gall midge project has demonstrated the capability of this insect to undergo four generations per year with the fourth generation showing very little evidence of pupation. It would appear that the majority of the larvae move out of the galls and to the soil for overwintering. For 3342 adults emerging from falls in the laboratory, the sex ratio was 1.59:1 (female:male). The endemic predator, *Zatropis nigroaenus*, was prevalent in galls collected from the second through fourth generations. The collection site near shelterbelt type plantings showed a lower incidence of predator occurrence (max. 43%) than an "open prairie" site (max. 75%) in 1993.

*Aphthona* spp. research is focusing on release strategies in two types of spurge infestations; "patch" treatments, where insects have been released on small, well defined areas of spurge and large scale treatments, where insects have been released in patterned grids or at uniform intervals along transects through large scale spurge infestations. The patterned grid study is also designed to obtain information on establishment success in relation to the time of collection of the insects which were released. Insects collected at approximately weekly intervals were released at different points on the grid and each point will be monitored for population increase and impact on the spurge. Each collection date is represented by five points on the grid. Impacts of larval feeding on roots will continue to be monitored and studies of the interactions of *A. lacertosa* and *A. czwalinae* within mixed populations will continue.