

### Summary

This paper summarizes my metapopulation studies on two butterfly species, the large heath (*Coenonympha tullia*) and the cranberry fritillary (*Boloria aquilonaris*). Both species occur on small open wetlands in central Sweden, but utilize different host plants. The fritillary is obligatory on cranberry, whereas the large heath uses several species of sedge. Suitable habitat occurs patchily, clustered within forests, and most local populations are small.

The fritillary is a good disperser, with daily flights between habitat patches, and it occurs in most forests with suitable hostplant patches. The large heath is a weak flier, and even populations separated by only 600 m seem isolated. Many apparently suitable habitat patches remain uncolonized by the large heath.

Hostplant choice experiments, with adults in the field and with larvae in a laboratory, have shown that the large heath indeed can utilize sev-

eral species of sedges that are present on empty patches. Instead, the isolation itself and the risk of extinction in small populations seem to be the cause of its restricted distribution. The hatchability of eggs laid by females from small populations is lower than normal, which may indicate genetical problems in small populations.

Both species show turnover in their occurrence, with local extinctions and recolonizations, but the turnover rate is not constant. Instead, extinctions occur only certain years, caused by weather conditions that affect all populations simultaneously.

My conclusion is that the landscape structure is an important determinant of regional distribution and abundance of patchily distributed butterflies. Suitable habitat may remain unoccupied due to low colonization probabilities and the risk of extinction in small populations. Furthermore, short term inventories may fail to detect the true distribution pattern and dynamic events in a butterfly metapopulation.

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