Effects of environmental gradients on the stability of host-parasitoid systems

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We consider host-parasitoid systems spatially distributed on a row of patches connected by migration. We analyze the effects of migration frequency, number of patches and environmental gradients on the stability of the host-parasitoid interactions. To take into account migration frequency, the hosts and parasitoids are allowed to move from one patch to the neighboring patch a certain number of times within a generation. When this number is high, aggregation methods can be used to simplify the proposed initial model into an aggregated model describing the dynamics of both the total host and parasitoid populations. The effects of environmental variability along the row of patches are introduced as gradients on parasitoid and host migration rates, parasitoid searching efficiency and host growth rate. The model is applied to Drosophila-Leptopilina host-parasitoid communities along the Rhône valley in South-Eastern France.

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