OLM6.1. Local density dependence

Sessile (sedentary) organisms compete for regulating factors like food or light only with their neighbours. Therefore it is not the average density but the local density of the population that affects them. The size of the effective neighbourhood always depends on the actual organism, but it is always possible to determine the distance within which the number of neighbours has the strongest effect on the vital rates of the focal individual. The effective distance was determined for the mouse-eared cress (*Arabidopsis thaliana*) in an experiment of Silander and Pacala (1985). They found that it is within a circle of 5 cm radius where the number of neighbours influences the seed production of this small annual plant (Figure 6.1.1).

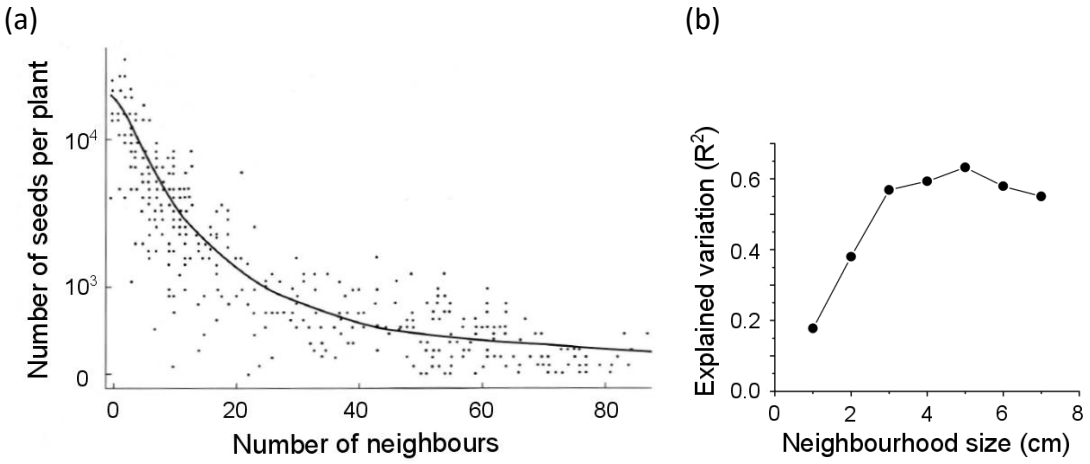

Figure 6.1.1: Distance between neighbours matters

a) Seed production of mouse-eared cress (*Arabidopsis thaliana*) individuals as a function of local density within neighbourhoods of 5 cm radius, in a plantation of sowing density 1000 – 10000 seeds/m^2. The number of neighbours was determined at about the time of flowering (after Silander and Pacala 1985). b) The strength of the dependence of seed production on local density changes with neighbourhood size. The dependence was found to be strongest at a radius of 5 cm (data from Silander and Pacala 1985).

References

Silander, J.A. and Pacala, S.W. (1985). Neighborhood predictors of plant performance. *Oecologia,* 66(2): 256-63.