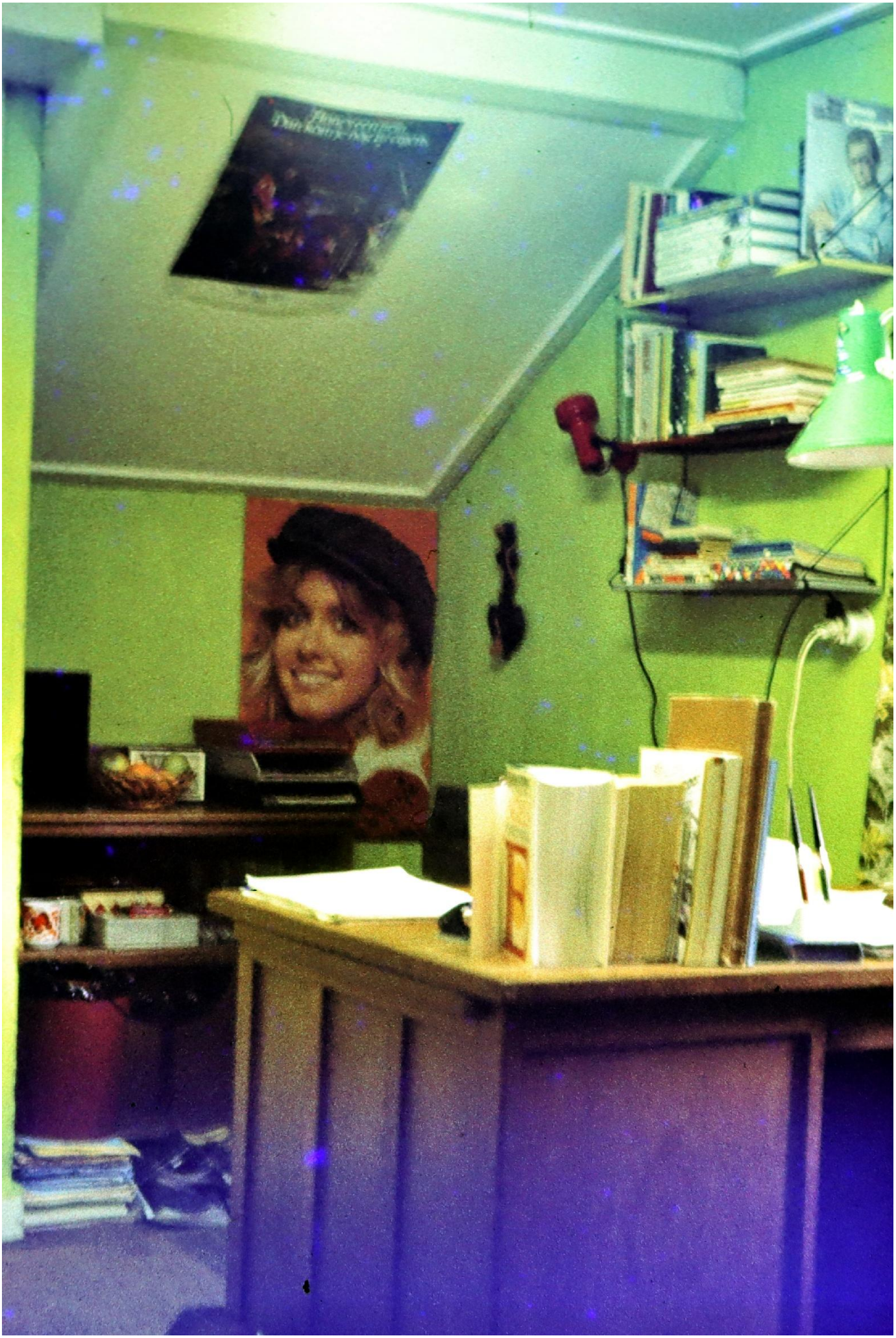


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NA 1050 m
UITGEZONDERD

Het is er uit eindelijk toch nog van gekomen! Als je meer ouderwijs wil, stuf dan even een seintje. Met hartelijke groet, Jan

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# THE CONTRASTING DYNAMICS OF TWO POPULATIONS OF *PLANTAGO LANCEOLATA* CLASSIFIED BY AGE AND SIZE

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## SUMMARY

(1) The dynamics of two populations of *Plantago lanceolata* from contrasting habitats are simulated with the use of matrix projection models. The fecundity and survival parameters that together form the matrix are based on demographic fieldwork and evaluated for both size and age categories at the same time.

(2) After verification of the model, elasticity analysis is applied to determine the model parameters that are most important in defining the population growth rate. The effect of more complex changes in the life histories on the population growth rate is evaluated by means of simulation.

(3) The results are in general agreement with expectations based on field observations: seed production is more important in an unpredictable environment, whereas adult survival is more important in a stable environment. In both populations seedling establishment is the most important phase in the life history, especially in the stable habitat.

(4) The formation of side rosettes is not so much a mode of vegetative reproduction as a way to increase the current year's seed production in an unpredictable environment.

(5) Timing of germination in spring or in autumn is important, but the effect of delay by means of a seedbank is unexpectedly small.

(6) The particular form of this matrix projection model is time-invariant. Because fecundity and survival are rarely constant over time, however, random sequences of bad, normal and good years are generated and incorporated in the model. The impact of this variation over time is evaluated using time-to-extinction as a measure.

## INTRODUCTION

Since their first formulation by Lewis (1942) and Leslie (1945), matrix projection models have been given much attention in population biology. Useful demographic properties can be obtained from solving the characteristic equation, either analytically or numerically. In the original form, matrix elements describe survivorship and fertility schedules based on age categories, but other categories can be used as well (Lefkovitch 1965) or even combinations of categories (Goodman 1969; Law 1983). Matrix models can be made stochastic (Pollard 1966; Boyce 1977; Tuljapurkar 1982) or functions of harvesting or density (Usher 1972) and arranged so that even quite complex life histories can be modelled (Caswell 1982). This shows the wide applicability of the matrix formulation for modelling populations and simulating the various effects of changes in the parameters in the model.

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