SUMMARY

AN ECOPHYSIOLOGICAL STUDY OF TWO KEY GRASS SPECIES, ANTHEPHORA PUBESCENS NEES AND ERAGROSTIS CURVULA (SCHRAD.) NEES

by

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The objective of the study was to determine the competitive abilities of A. pubescens and E. curvula, and to examine the differential effects of both intra - and interspecific competition.

Both species investigated proved to be highly plastic in their ability to regulate their size under prevailing conditions of density stress; intra - and interspecific competitive stress. Intraspecific competition proved to have a greater negative affect on the total vegetative yield per plant and per pot of

E. curvula, while interspecific competition had a greater negative affect on the total vegetative yield of A. pubescens.

The relationship between density and the above - ground dry mass, for both species investigated, could be described by the reciprocal yield law.

Results of the competition experiments indicate that E. curvula has a clear advantage over A. pubescens. In most of the replacement series the relative yield total exceeded one, which indicates a degree of niche differentiation between species.

The detrimental effect of intra - and interspecific competition on the growth of both species was illustrated by the constraints placed on the net CO_2 uptake rate per unit leaf area and resultant retarded growth rate and restricted morphological development. In addition to the height advantage of E. curvula, resulting in improved light utilisation, the increased root system of E. curvula over the growing season may have resulted in more effective uptake at the expense of A. pubescens. A combination of these characteristics may accrue for the competitive superiority of E. curvula, in comparison to the competitive inferiority of A. pubescens. The poor competitive ability of A. pubescens under conditions of interspecific competition could, however, not be supported by the field survey conducted in a natural plant community.

OPSOMMING

'N EKOFISIOLOGIESE STUDIE VAN TWEE SLEUTEL - GRASSPESIES, ANTHEPHORA PUBESCENS NEES EN ERAGROSTIS CURVULA (SCHRAD.) NEES

deur

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Die doel van die studie was om die kompeterende vermoëns van A. pubescens en E. curvula te bepaal, en om die verskeie invloede van intra - en interspesifieke kompetisie te ondersoek.

Beide spesies het 'n groot mate van plastisiteit getoon in hulle vermoë om hul grootte te reguleer onder heersende toestande van digtheidspanning; intra - sowel as interspesifieke kompetisie. In die geval van E. curvula het intraspesifieke kompetisie 'n groter

nadelige invloed op die totale vegetatiewe opbrengs per plant en per pot gehad, terwyl interspesifieke kompetisie 'n groter nadelige invloed op die totale vegetatiewe opbrengs van A. pubescens gehad het.

By beide spesies is 'n goeie passing tussen die bogrondse droëmassa per plant en digtheid met behulp van die resiproke opbrengswet verkry.

Resultate van die kompetisie - eksperimente het aangetoon dat E. curvula 'n duidelike kompeterende voordeel bo A. pubescens het. In die meerderheid van die vervangingsreekse was die totale relatiewe opbrengs meer as een, wat daarop dui dat daar 'n mate van nisdifferensiasie tussen die spesies voorkom.

Die nadelige invloed van intra - en interspesifieke kompetisie op die groei van beide spesies is geïllustreer deur die beperkings wat op die netto CO_2 - opnametempo per eenheid blaaroppervlakte en gevolglike vertraagde groeitempo en morfologiese ontwikkeling geplaas is. Benewens E. curvula se hoogtevoordeel, wat tot verbeterde ligverbruik gelei het, het E. curvula se wortelstelsel oor die groeiseisoen toegeneem wat moontlik gelei het tot verbeterde opname, tot die nadeel van A. pubescens. Eragrostis curvula se sterker kompeterende vermoë, in vergelyking met

A. pubescens se swak kompeterende vermoë, kan moontlik aan 'n kombinasie van dié kenmerke toegskryf word. Anthephora pubescens se swak kompeterende vermoë, onder toestande van interspesifieke kompetisie, word egter nie ondersteun deur die veldopname wat in 'n natuurlike plantgemeenskap gemaak is nie.

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