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THE INFLUENCE OF COMPETITION FOR  
LIGHT ON THE DRY MATTER PRODUCTION  
AND EAR FORMATION OF WHEAT PLANTS.

by

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## CONTENTS

	Page
SUMMARY	1
SOURCE OF INFORMATION	3
ACKNOWLEDGEMENTS	4
INTRODUCTION	5
REVIEW OF LITERATURE	
(a) Competition in general.	8
(b) Competition for light.	9
(c) The effect of competition on the components of yield.	12
(d) Factors affecting tillering.	16
(e) Differences in field and pot responses to nitrogen.	18
(f) Photosynthesis and the grain yield of the ear.	20
(g) The determination of ear size.	23
(h) Conclusion.	27
METHODS	
I. Design of the experiment.	29
II. Experimental technique.	30
(a) Preparation.	30
(b) Sowing.	34
(c) Procedure after planting and emergence.	34
(d) Light measurements.	37
(e) Air temperatures.	37

	Page
III. Collection of data.	37
(a) Dates of harvest.	37
(b) Sampling methods.	38
(c) Supplementary data.	39
(d) Harvest procedure.	39
(e) Plant nitrogen determinations.	42
(f) Total soil nitrogen.	42
 RESULTS	
I. A general account of the results.	43
II. The environment.	45
(a) Temperature.	45
(b) Light intensity.	47
III. Plant measurements.	48
(a) Dry weight per plant.	49
(b) Dry weight per m <sup>2</sup> .	49
(c) Tillers per plant.	51
(d) Leaf area per plant.	51
(e) Leaf area index.	53
(f) Leaf numbers and leaf appearance rate.	53
(g) Area of the individual leaves.	55
(h) Leaf area/leaf weight ratios.	56
(i) Apex length.	57
(j) Development of the apex.	58
(k) Dates of ear emergence and anthesis.	60
(l) Length and breadth of ears.	60

	Page
(m) Development of spikelets.	61
(n) Number of grains per fertile spikelet.	61
(o) Number of grains per ear.	61
(p) Weight of grain per ear and per plant.	67
(q) Weight per grain.	67
(r) Percent nitrogen content.	67
(s) Yield of nitrogen ( $g/m^2$ ).	68
(t) Yield of nitrogen per plant.	70
(u) Total soil nitrogen.	71
(v) Height of stem.	71
<b>DISCUSSION</b>	
(a) Tillering.	74
(b) Dry matter production.	75
(c) Uptake of nitrogen.	78
(d) Leaf development.	79
(e) Head formation.	81
(f) Conclusion.	84
<b>APPENDIX</b>	87
<b>BIBLIOGRAPHY</b>	138

Number 13 is missing from page numbers.

FIGURES

No.		Following page:
1.	Layout of glasshouse.	30
2.	Maximum and minimum temperatures.	45
3.	Changes in light intensity within the crop for plants grown in the field (from Puckridge 1962).	48
4.	Dry weight per plant.	49
5.	Dry weight per square metre.	49
6.	Leaf area per plant.	52
7.	Leaf area index.	53
8.	Area per leaf.	55
9.	Leaf area: leaf weight ratios.	56
10.	Components of grain yield and yield of nitrogen as grain.	67
11.	Effect of time of transfer on the development of spikelets.	82

PLATES

No.	Following page:
1. High density treatments showing the arrangement of tubes.	29
2. General view of low density plants.	29
3. Growth of high density treatments at day 72.	43
4. Comparison of plants of N <sub>3</sub> at day 82 for different transfer occasions.	43
5. Comparison at day 82 of plants of the three nitrogen levels for two transfer occasions.	43
6. Root development.	47
7. Morphological development of the wheat apex (after Khalil 1956).	58
8. Comparison of ears at the final harvest.	61

S U M M A R Y

Wheat plants were grown in a glasshouse without artificial illumination to study the effect of plant density on yield. By growing the plants in narrow individual containers the effects of root competition were controlled and this allowed a closer study of competition for light and its effects on tillering, dry matter production and head formation. The spacing could be altered at any stage with little effect on growth, thus providing information on the effects of treatments of different duration. All plants commenced growth with the containers packed closely together at a high density of 1150 plants/m<sup>2</sup> and at intervals plants were removed and spaced out widely, thus having the effect of transferring from conditions of intense competition for light to conditions of low density with negligible competition.

The plants at high density were limited in their growth by intense competition, apparently for light. Transfer to low density removed this limitation and the plants produced a greater amount of dry matter, particularly with the plants that produced tillers. Plants remaining at high density did not produce tillers as a result of the intense competition, but did produce tillers if removed to low density by day 36. Low nitrogen level was an additional factor in the reduced tillering of the widely spaced plants.

The total number of spikelet primordia per ear increased with increasing nitrogen level, but was not affected by time of transfer to low density. However, the number of these primordia which developed to give fertile spikelets was affected by both nitrogen level and time of transfer. It is suggested that competition for light at high density resulted in a reduced supply of assimilates to the developing apex and competition for this assimilate between spikelets. There was also an interaction with nitrogen. The critical period for the effect of this competition on the development of the spikelets was from immediately prior to elongation of the rachis to ear emergence. Intense competition at this stage could reduce the grain yield per ear to less than half of that which would be obtained if all spikelets developed fully.