



PROJECT REPORT No. OS3

**LINSEED: COMPONENTS OF
YIELD STUDY**

JUNE 1992

Price £2.00



HGCA OILSEEDS PROJECT REPORT No. OS3

LINSEED: COMPONENTS OF YIELD STUDY

by

J. B. S. FREER

ADAS Bridgets, Martyr Worthy,
Winchester, Hants SO21 1AP.

(from May 1992 at: ADAS Cambridge, Block C, Government Buildings,
Brooklands Avenue, Cambridge CB2 2BL)

Whilst this report has been prepared from the best available information, neither the authors nor the Home-Grown Cereals Authority can accept any responsibility for any inaccuracy herein or any liability for loss, damage or injury from the application of any concept or procedure discussed in or derived from any part of this report.

Reference herein to trade names and proprietary products without special acknowledgement does not imply that such names, as defined by the relevant protection laws, may be regarded as unprotected and thus free for general use. No endorsement of named products is intended nor is any criticism implied of other alternative products.

LINSEED: COMPONENTS OF YIELD STUDY (OS 12/1/92)

C001\102

J B S Freer, ADAS Bridgets, Martyr Worthy, Winchester, Hants SO21 1AP
Tel: 0962 78765

Final report

3 month contract commencing August 1991

ABSTRACT

A detailed study of the components of a crop of linseed that determine the seed yield was made in 1991. Sub samples of thirty plants from five distinct populations were taken and analysed. Number of tillers/plant, number of capsules/plant, and number of seeds/capsule were recorded. The thousand seed weight and the weight of individual plants components was measured and a harvest index and theoretical yield calculated and compared with the combine harvested yield of that population. Crops with low plant populations compensated for fewer plants by increasing tillering and capsule number. The harvest index for linseed was calculated at 38%. Yields from populations of 233-713 plants/m² were similar due to compensation.

OBJECTIVES

To investigate the components of yield of linseed as affected by plant population.

INTRODUCTION

Trials conducted by ADAS 1986-1989, have shown that growers can make considerable savings by reducing the seedrate for linseed (Freer & Sansome, 1991). A study conducted by the Institute Technologique du Lin in France has suggested that plants with one or two tillers have a higher yield potential than single untillered plants (Essautier, personal communication). By manipulating plant density tillering can be encouraged.

Understanding the factors that contribute to the yield of linseed is an important facet of crop husbandry and may enable manipulation of the crop to improve yields without increasing husbandry inputs.

MATERIALS AND METHODS

A number of distinct populations of linseed were established by sowing at different seedrates as part of an experiment examining establishment techniques.

Plant and tiller populations were measured by counting the number of plants from rows both sides of a 0.5 m rod.

Ten whole plants were removed from those selected from within the 0.5 m of row populations. The samples were placed in linen bags and stored in an airy room until the following assessments were made.

Assessments

The number of tillers bearing capsules and the number of capsules per tiller was counted. The capsules were then removed from each tiller and threshed by hand. The number and weight of the seeds was recorded.

Sites

The study took place at ADAS Bridgets, Hampshire in 1991. A crop of linseed, cv. Blue Chip, was sown on 3 April following a previous crop of winter wheat.

Design

The samples for the study were obtained from three replications of an experiment examining methods of establishment and seedrates. This provided a number of different plant populations from which samples were removed.

The sample consisted of 10 plants from each plot, bulked to give thirty plants from each population.

RESULTS

Populations of 233, 346, 402, 537 and 713 plants/m² were established ($\underline{P}=0.05$) as part of an experiment examining methods of establishment. Tiller numbers per plant decreased as plant population increased ($\underline{P}=0.05$) (Fig. 1). Capsules per plant decreased in a similar manner ($\underline{P}=0.05$) (Fig. 2). Plants had an average of 11 capsules per tiller. There were 7 seeds per capsule which remained constant irrespective of plant population, as did the thousand seed weight (Fig. 3). As a result seed yield per plant decreased as population increased (Fig. 4). Thus, the theoretical yield was similar for all populations (Fig. 5).

Table 1. The components of yield of linseed grown at different populations.

Component	Population density (plants/m ²)					(SED)
	233	346	402	537	713	
						(44.3)
Tillers/m ²	433	602	539	591	734	(43.3)
Tillers/plant	1.87	1.80	1.37	1.10	1.03	(0.210)
Capsules/plant	21.5	19.4	15.9	11.2	9.2	(1.12)
Capsules/m ²	5010	6712	6392	6014	6560	(49.6)
Seeds/capsule	6.73	6.89	6.79	6.46	6.15	(NS)
Seeds/plant	144.7	133.7	107.9	72.3	56.6	(6.42)
Seeds/m ²	33,715	46,260	43,376	38,825	40,356	(284)
T.G.W. (g)	9.37	8.57	8.77	9.47	9.87	(NS)
Seed wt./plant (g)	1.2	1.2	1.0	0.7	0.5	(NS)
Indiv. plant wt. (g)	3.0	2.9	2.7	1.8	1.5	(NS)
Harvest index	40.0	41.4	37.0	38.9	33.3	(NS)
Theoretical yield (t/ha at 91% dm)	3.5	4.0	3.8	3.7	4.0	(0.7)
Combinable yield (t/ha at 91% dm)	2.4	2.7	2.6	2.6	2.6	(0.27)

Harvest index was 38% (Fig. 6). This compares with c. 50% for wheat and c. 25% for oilseed rape. Individual plant weight reduced as the population increased which accounted for the lack of variation in harvest index (Fig. 7).

The theoretical yield potential of linseed in this experiment was c. 4 t/ha. This compares with c. 12 t/ha for winter wheat and c. 6 t/ha for oilseed rape.

There was a close correlation between actual and theoretical yields. (Fig. 8). Theoretical yields suggest that actual yields by combine harvesting could be increased.

DISCUSSION

This study has shown the effect of linseed plant density on the components that contribute to yield. It has demonstrated that, within the plant populations examined, the linseed crop is able to compensate at low populations by increasing the number of capsules each plant produces and thus produce similar yields. This suggests that a seedrate of 37 kg/ha was adequate for optimum yield.

Further investigation of other husbandry inputs, such as the use of plant growth regulators, using a similar procedure would explain the way the crop behaves when subjected to such treatment.

REFERENCES

Freer, J.B.S. & Sansome, G. (1991). The influence of plant density and nitrogen fertility on the yield and quality of linseed. Aspects of Applied Biology, 28. 49-54.

Figure 1. Tiller number

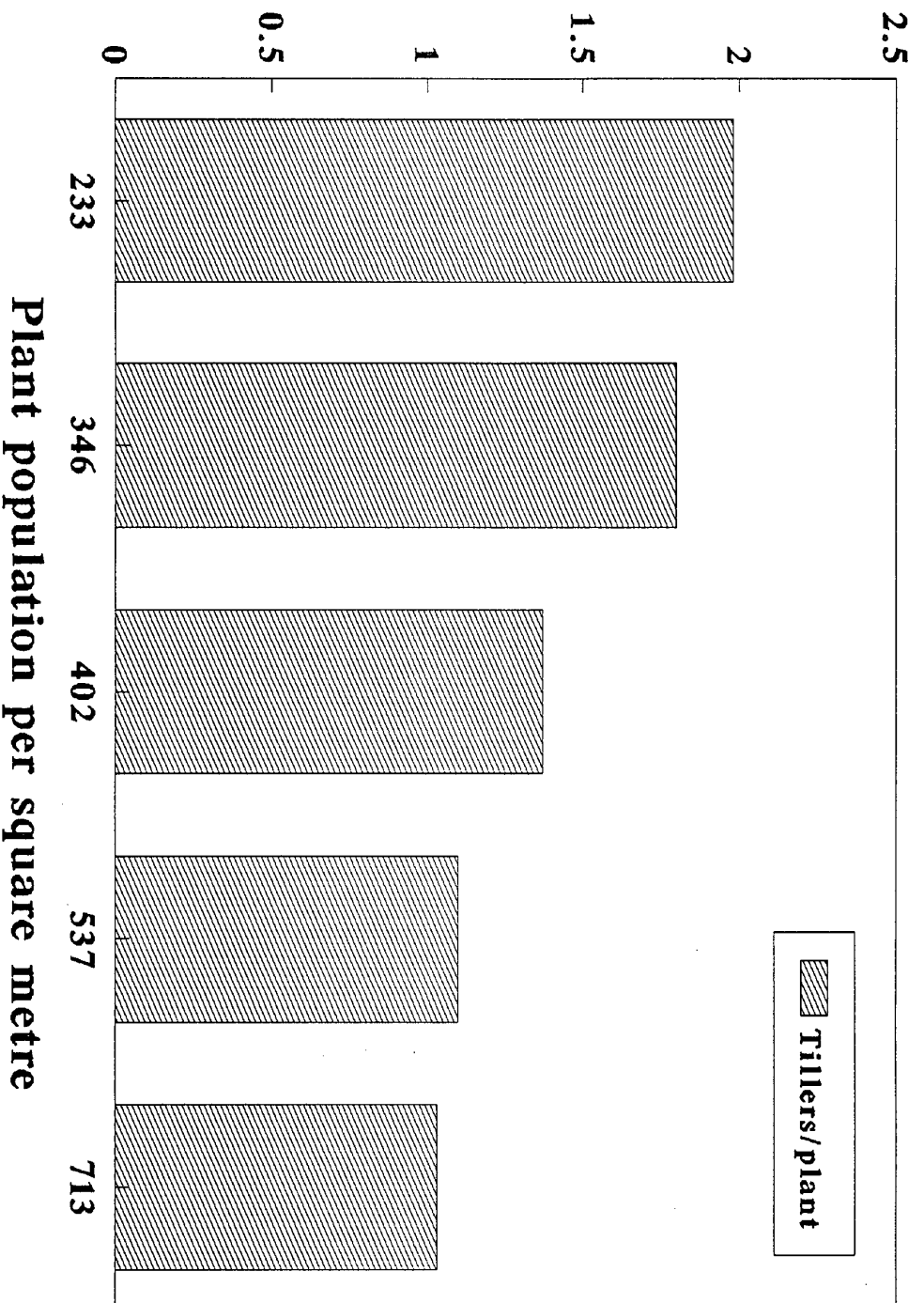


Figure 2. Capsule number

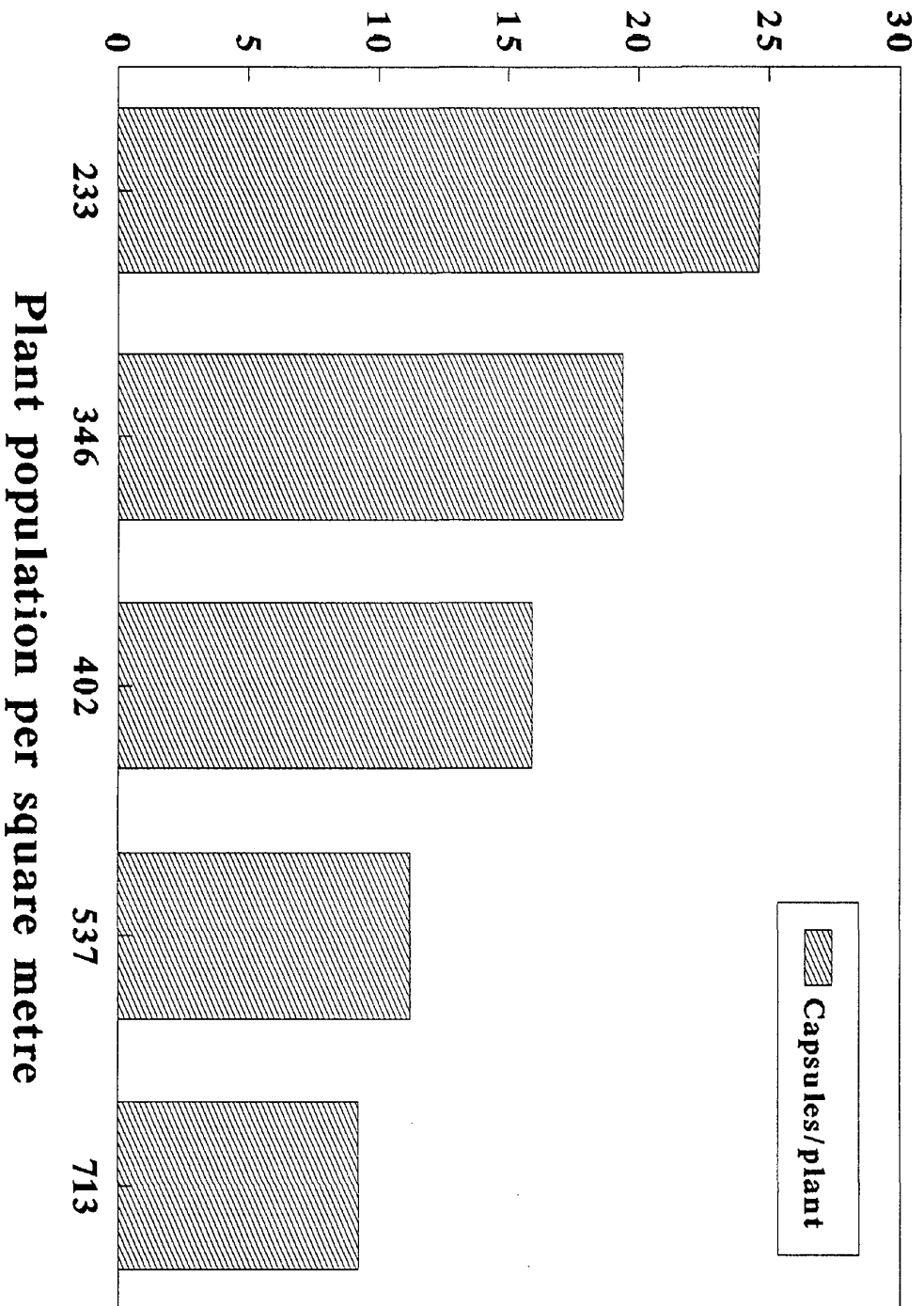


Figure 3. Thousand seed weight

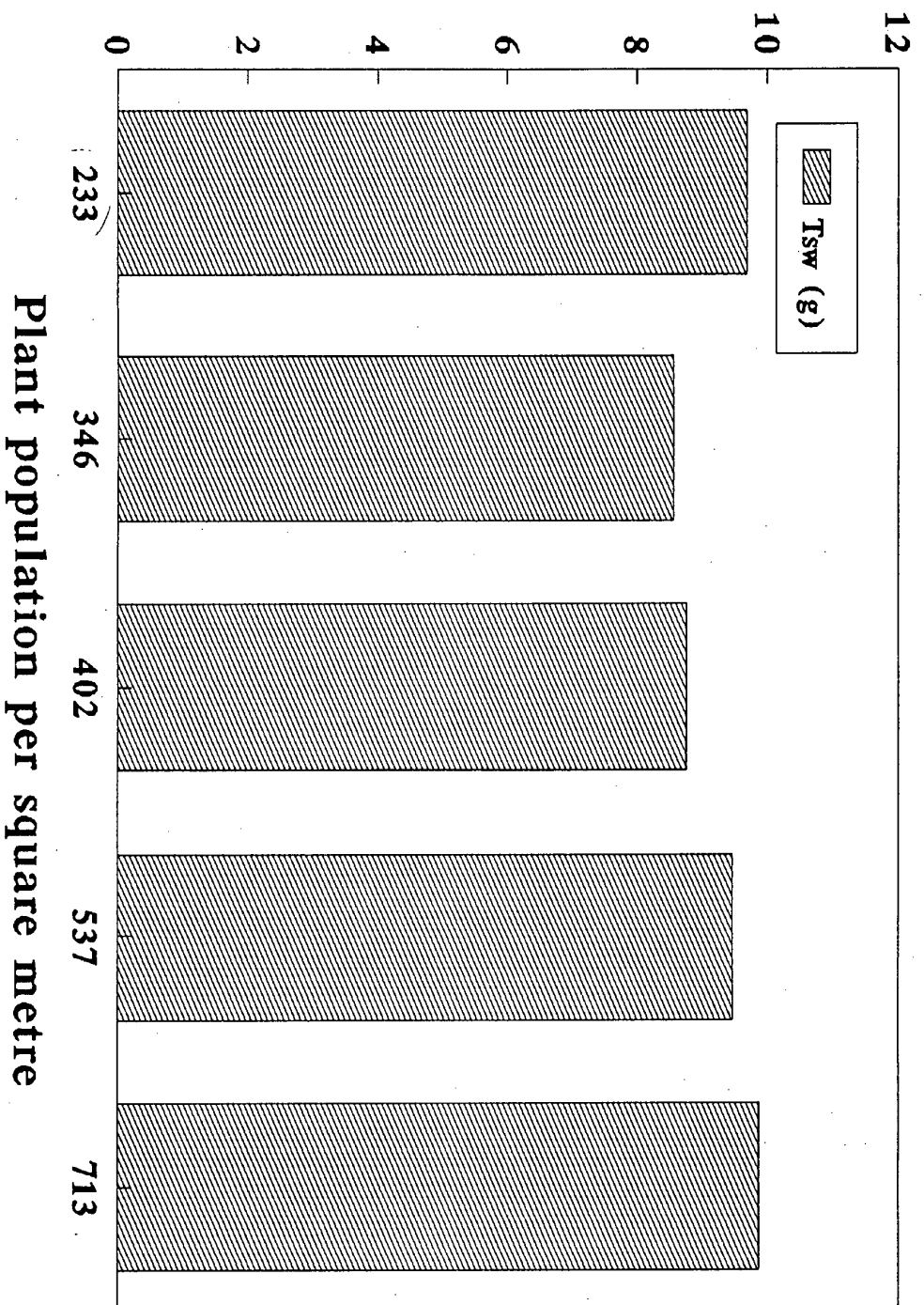


Figure 4. Weight of seed per plant.

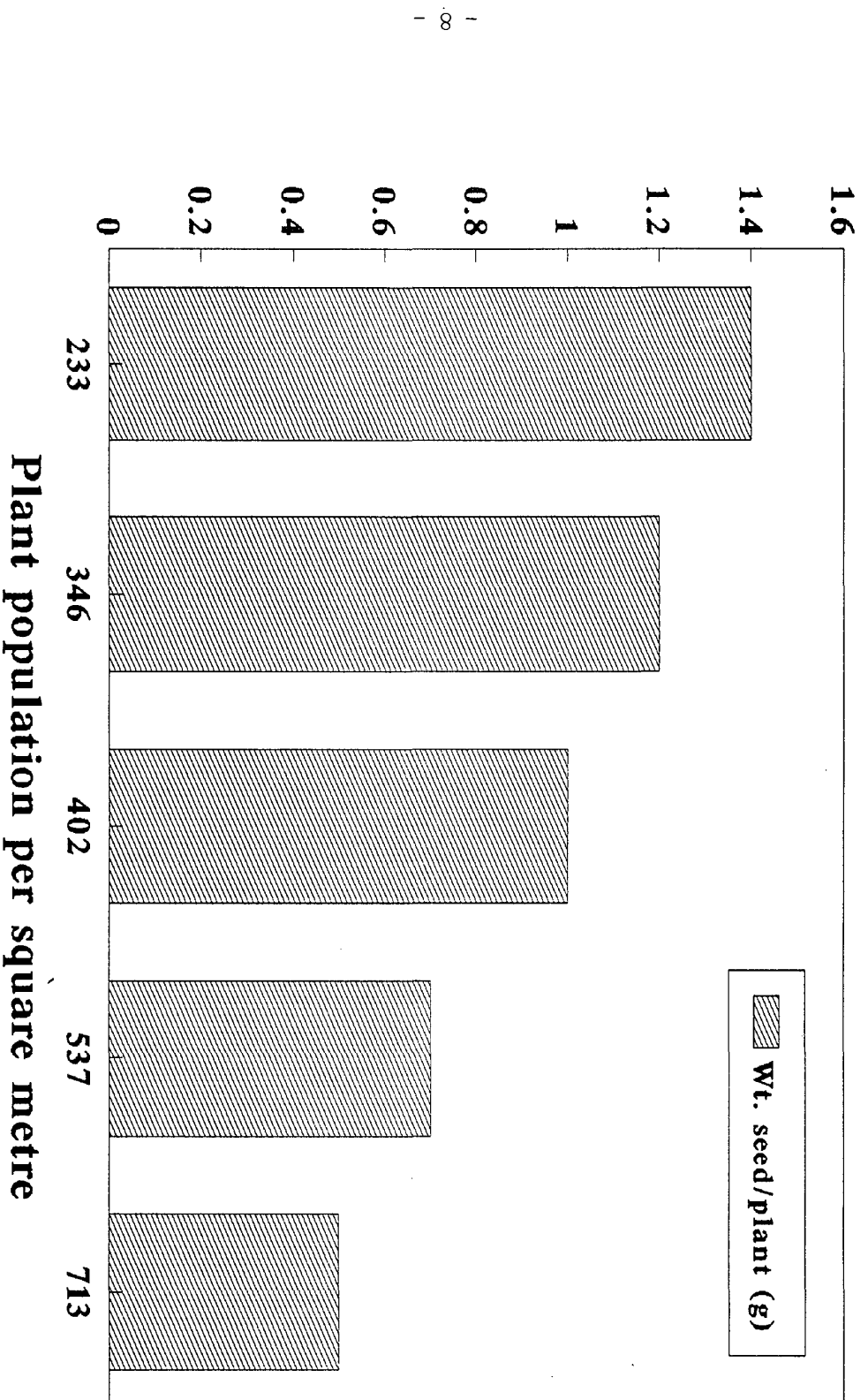


Figure 5. Theoretical yield

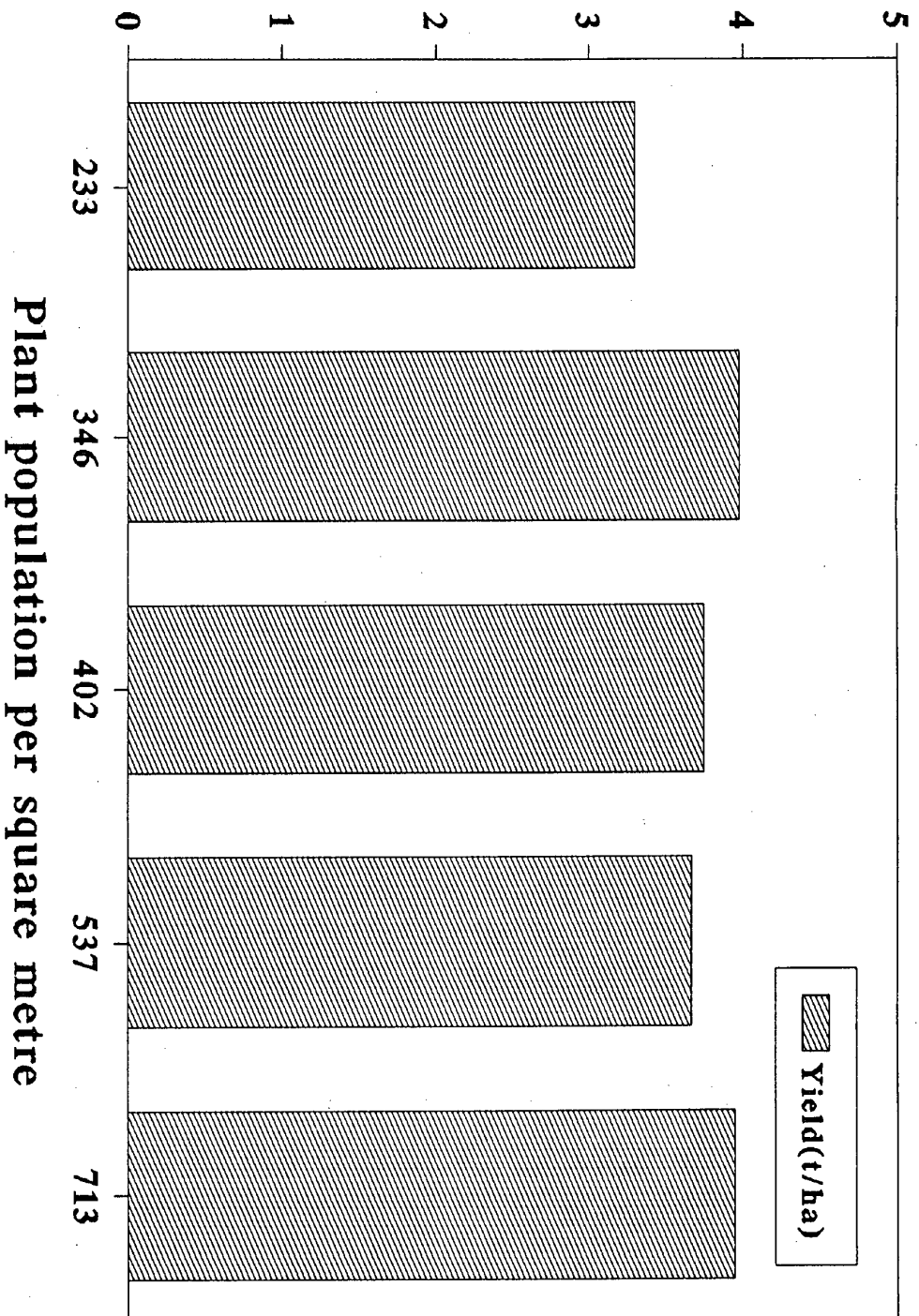


Figure 6. Harvest index

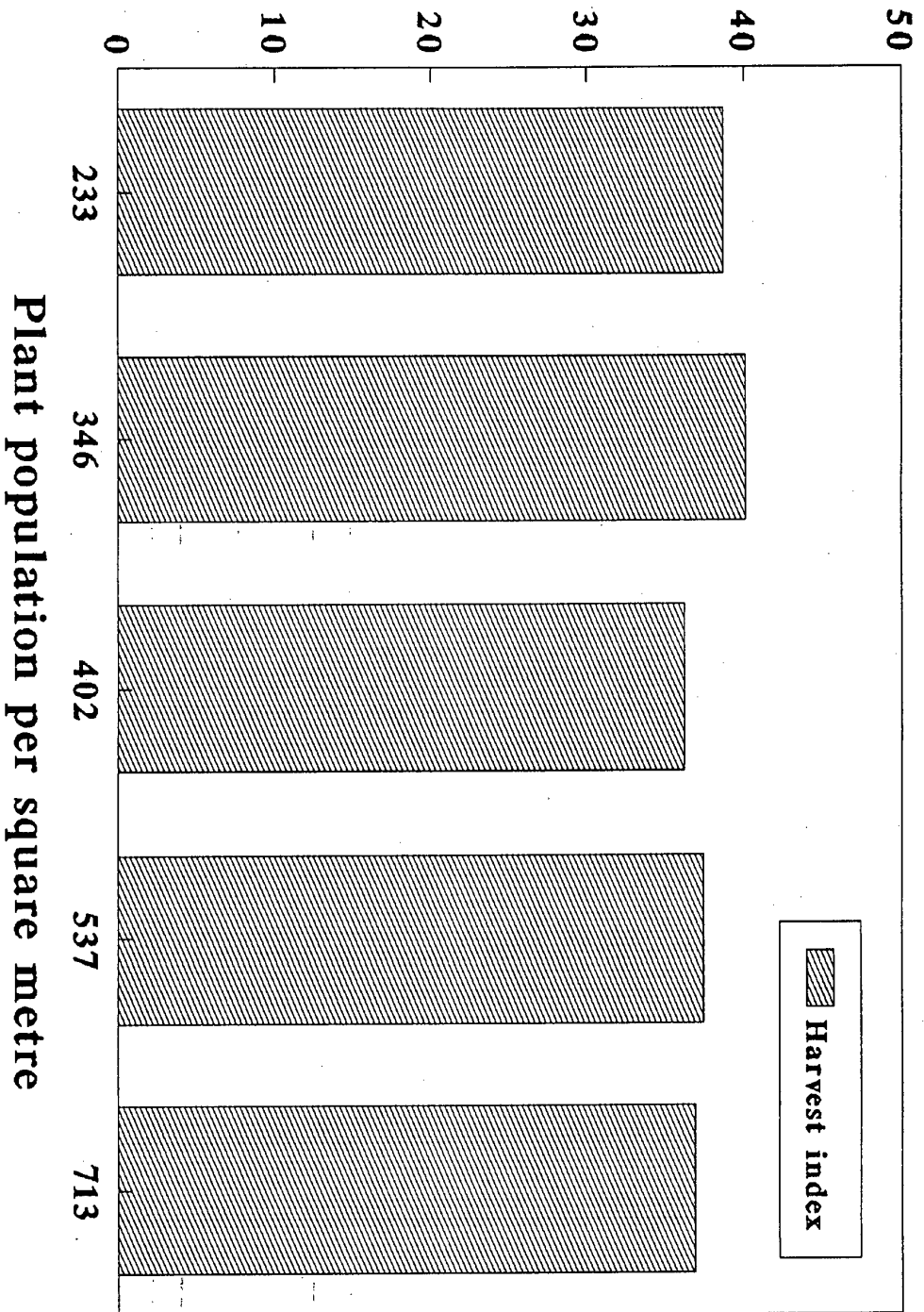


Figure 7. Individual plant weight

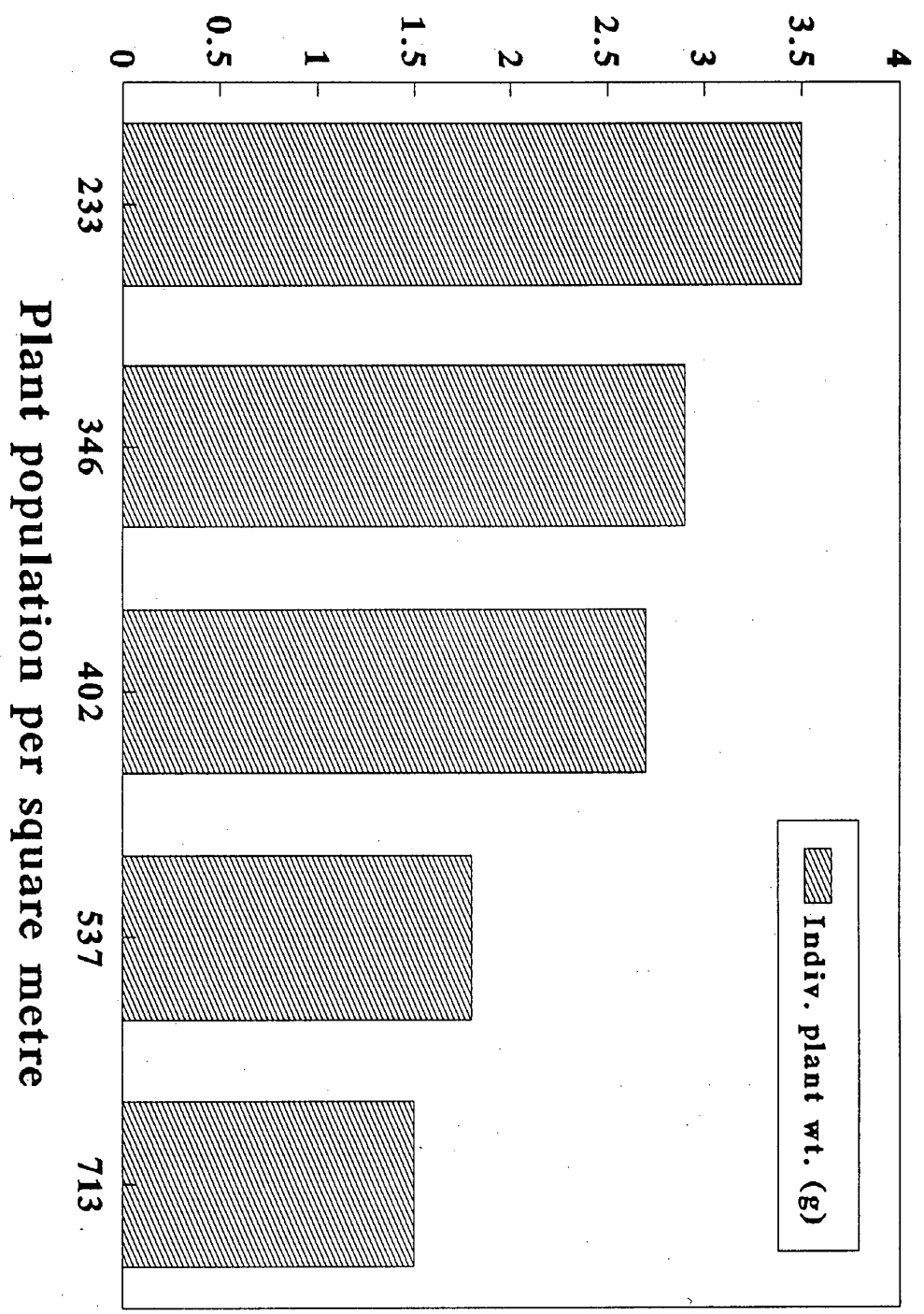


Figure 8. Theoretical vs actual yield

