# A COMPARISON OF TRITICALE AND OATS AS FORAGES FOR FATTENING CATTLE IN SOUTH EAST QUEENSLAND

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## SUMMARY

Saia oats *(Avena strigosa)* and 'Gro Quik' triticale were compared as forage crops at 2 stocking rates (3.75 and 5.00 steers/ha) in two experiments over the winter period in south eastern Queensland. Oats produced higher forage yields early in the season, with triticale showing more rapid growth in mid season. Triticale did not significantly extend the feed supply into late winter. Cattle in both experiments grew significantly ($P<0.05$) better on triticale than on oats at equivalent stocking rates, and early in the season triticale supported high growth rates (0.91 kg/d) even at high stocking rates (5 steers/ha). These results indicate that triticale was of higher nutritive value for growing cattle than was oats, although it yielded less forage.

## INTRODUCTION

The growth of cattle on native and improved tropical pastures declines in the cool winter months in south eastern Queensland, and oats is traditionally used in this period to maintain continuity of feed supply. Late maturing varieties and late planting are usually recommended, and where low stocking rates are used (2.2 to 3.7 an/ha), high weight gains in finishing cattle are obtained (Smith 1969; Strachan and Boorman **1970)** in the late winter spring period. Triticale is a hybrid cereal derived from an interspecific cross between wheat (*Triticum durum*) and rye (*Secale cereale*) and the grain is useful as an animal feed (Farrell et *al*. **1980;** King **1980).** Triticale cultivars have produced as much forage as wheat and oats but less than rye (Brown and Almodares 1976), and superior weight gains (kg/hd) and longer grazing periods in grazing beef calves (Bertrand and Dunavin 1974).

Triticale has not been evaluated as a forage crop under Australian conditions, and the major commercial variety available 'Gro Quik' is late maturing, grows well on sandy soils and has good disease resistance. The following experiment compares the lengths of growing season, forage yields and growth of cattle on oats and triticale, so that the relative merit of triticale as a forage crop may be determined.

## MATERIALS AND METHODS

### Experimental site and crop management

The experiment was conducted at Mt Cotton research farm (University of Queensland) in south eastern Queensland. The climate is subtropical with a summer dominant rainfall (1400 mm/yr). The soils on the farm are red-yellow podzolic and deficient in most plant nutrients (Blunt and Humphreys 1970). The experimental paddocks were previously sown to summer sorghum and after cultivation were planted to oats and triticale on April 15, 1980, with the application of superphosphate (200 kg/ha) and KCl (100 kg/ha). Saia oats (*Avena strigosa)* and Gro Quik Triticale were sown into randomly assigned paddocks at the same rate (90 kg/ha), and N (urea) applied (60 kg N/ha) one month before and at monthly intervals after planting. Irrigation (38 mm) was applied on 7 occasions, and grazing commenced 7 weeks after planting.

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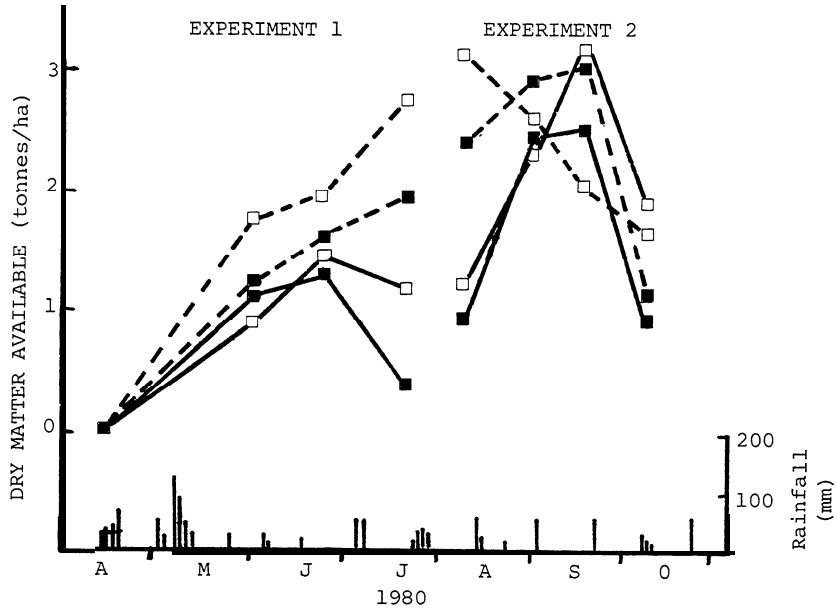


Fig. 1. Mean dry matter yields of oats (---) and triticale (——) grazed at 3.75 (□) and 5.00 (■) steers/ha in two successive experiments.

## Cattle and their management

Two separate groups of cattle were used. In the first experiment, 12 hereford steers (2-2½ yrs), mean initial live weight 371 kg, were randomly allocated to the 4 treatment groups. All cattle were weighed after a 16 h fast and drenched with Levamisole (Nilverm, I.C.I.) at 3 weekly intervals. The same procedures were used for experiment 2, except younger cattle (1½ yrs, mean initial liveweight 302 kg) were used. In each experiment, all cattle were removed when forage availability in any one treatment was judged inadequate for continued liveweight gain.

## Experimental design

Each experiment was an unreplicated 2 x 2 factorial with two forage species (oats and triticale) grazed by 3 cattle at 2 stocking rates (3.75 and 5.00 steers/ha). During each experiment, each treatment was continuously grazed, and appropriate stocking rates obtained by adjusting paddock size (0.6 and 0.8 ha). The first experiment lasted 43 days (June 4 to July 23, 1980) and the second experiment for 56 days (August 13 to October 10, 1980). All paddocks were destocked for 3 weeks between the two experiments.

## Measurements and analysis

Each experimental plot was sampled (0.1% of area) at 3 weekly intervals for forage yield and composition (green and dead leaf and stem). Green leaf was analyzed for total N by Kjeldahl digestion and auto analysis (Henzell *et al.* 1968).

TABLE 1 Mean values for the yield of available green leaf (kg/animal) and percentage leaf in oats and triticale grazed by cattle at two stocking rates

| HARVEST DATE | STOCKING RATE (an/ha) | | | | L.S.D. |
|---|---|---|---|---|---|
| | Oats | | Triticale | | |
| | 3.75 | 5.00 | 3.75 | 5.00 | (P<0.05) |
| Experiment 1 | | | | | |
| JUNE 4 | 284(61)* | 211(85) | 205(81) | 173(77) | 60(15) |
| JUNE 27 | 223(43) | 134(41) | 216(53) | 134(47) | 58(12) |
| JULY 23 | 201(28) | 96(25) | 87(27) | 15(20) | 62(12) |
| Experiment 2 | | | | | |
| AUG. 13 | 183(23) | 234(52) | 124(38) | 124(64) | 55(11) |
| SEPT. 9 | 183(27) | 159(28) | 147(24) | 125(25) | 62(12) |
| SEPT. 24 | 38 (7) | 23 (4) | 34 (4) | 24 (5) | 21 (7) |
| OCT. 10 | 6 (1) | 6 (3) | 18 (4) | 7 (4) | 20 (3) |

* Values in parenthesis are percentages of green leaf in dry matter

Analysis of variance was used to determine the effects of forage type and stocking rate on liveweight gain, and Duncans Multiple range test was used to detect differences between means (Steel and Torrie 1960).

## RESULTS

Fig. 1 shows mean values for the dry matter yields (kg/ha) of oats and triticale at the different stocking rates in both experiments, and the climatic data associated with these yields. At the commencement of grazing (Experiment 1), oats had produced significantly (P<0.05) higher dry matter and green leaf yields when compared with triticale, and throughout this experiment oats maintained higher yields under both stocking rates. Table 1 gives the mean green leaf yields available (kg/animal) and the percentage of leaf in each crop during each experiment. The first experiment was terminated when triticale yields declined to low levels under the high stocking rate treatment. Even after destocking for 3 weeks, triticale, although leafier, still provided less leaf than oats as the beginning of experiment 2, but persisted better than oats during the first 6 weeks of grazing. Oats and triticale previously grazed at the high stocking rate were significantly (P<0.05) leafier than comparable paddocks previously grazed at the lower stocking rate. After 4 weeks grazing, there were no significant differences between the two crops in either leaf percentage or yield, and both crops thereafter progressed to maturity at a similar rate. There was no significant effect of species, time of sampling or stocking rate on the N content of the green leaf. Mean values were 34.4 and 39.7 gN/kg dry matter for triticale and oats respectively.

Table 2 gives mean values, with SE, for the liveweight change (kg/d) of cattle during each experiment. In both experiments,cattle grazing triticale had significantly (P<0.05) higher liveweight gains when compared with those grazing oats at the same stocking rate. The effects of stocking rate on liveweight gain were different in each experiment. In experiment 1, increased stocking rate significantly (P<0.05) decreased the liveweight gain of cattle grazing oats, but did not affect the gains of those on triticale. However in the second experiment stocking rate significantly (P<0.05) decreased weight gain of cattle on triticale but not on oats. The lower growth rates (kg/d) of cattle in this experiment compared with the first were related mainly to their lower initial live weight.

TABLE 2 Mean values, with standard errors, for the live weight (kg) and live weight change (kg/d) of cattle grazing oats and triticale at two stocking rates.

| Experiment and Duration | Mean Live weight (kg) | STOCKING RATE Oats 3.75 | Oats 5.00 | Triticale 3.75 | Triticale 5.00 | L.S.D. (P < 0.05) |
|---|---|---|---|---|---|---|
| Experiment 1 (43 d) | 393 | $0.81^{\phi}_{ad}$ | $0.54_{b}$ | $1.02_{c}$ | $0.91_{cd}$ | 0.20 |
| Experiment 2 (56 d) | 333 | $0.68_{ac}$ | $0.56_{a}$ | $0.98_{b}$ | $0.74_{c}$ | 0.17 |

ø Values within rows with dissimilar subscripts differ significantly (P<0.05)

## DISCUSSION

Saia oats provided more forage than triticale early in the season, and this is a typical growth pattern for this early maturing species. (Murphy and Whiteman 1981). Triticale was badly affected by unseasonally heavy rain in early May, and waterlogging caused the-death of some plants, and probably slowed the growth of others. This suggests that triticale may be less suitable than oats in soils prone to waterlogging. The lower forage yield of triticale may also be partly attributed to lower plant density. Triticale has a larger seed than oats and an equivalent sowing rate to 90 kg/ha for oats would be 139 kg/ha triticale seed. The high early yields of oats were achieved by heavier sowing rates than normally recommended.

Although triticale did not extend the growing season when compared with oats, cattle grazing triticale had higher growth rates throughout the whole season, and these higher gains were sustained at higher stocking rates than those for cattle grazing oats. Strachan and Boorman (1970) have reported average daily gains of 1 kg for steers grazing oats (2.2/ha)over a 100 day period (220 kg live weight gain/ha). In the present study, similar daily weight gains were achieved for the 2 groups of cattle grazing triticale (3.75/ha) over the 120 days of crop growth (370 kg live weight gain/ha). At the higher stocking rate (5 steers/ha) 403 kg live weight gain/ha was obtained. Comparable productivity from oats was 274 and 273 kg/ha for stocking rates of 3.75 and 5 steers/ha respectively.

The higher nutritive value of triticale compared with oats was not reflected by differences in either the percentage of leaf in the crop, leaf yield or protein content. The better growth of cattle on triticale may therefore be related to higher intakes or digestibility of this forage when compared with oats. The superior performance of triticale on poor soils, its high level of disease resistance and nutritive value indicates that triticale may be a useful alternative forage crop to oats for fattening cattle.

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