

Fodder production from irrigated crops in northern Victoria

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Animal production in the irrigation areas of Northern Victoria is limited by the low rate of conversion of solar energy to plant dry matter (DM) by pasture species currently used for grazing. Perennial pastures monitored at Kyabram Research Institute average 47.6 kg/ha/day (1), representing a 1.1% conversion of photosynthetically-active radiation. Maximum growth rates in experimental plots with high rates of N and P over the summer period were: white clover, (101 kg/ha/day (1.52% conversion)); perennial ryegrass, 74 (1.11%) and paspalum, 219 (3.29%) (2). Temperate pasture species do not have the capacity to use efficiently the high temperatures and high radiation levels in summer. Paspalum, which is a sub-tropical grass, grows well in summer but is dormant in winter. Annual pastures grow at 46.1 kg/ha/day (1) which is a 1.6% conversion of radiant energy during their growing period, with a peak rate of 77 kg/ha/day in October.

Current fodder crop research has shown that in the same environment, under good irrigation management, the following crop species have much higher rates of conversion of solar energy than temperate pasture species.

Table 1. Dry matter production from irrigated crops

	1979/80	kg/ha/day	1980/81	kg/ha/day
Maize (XL77)	26,189	205	24,215	191
Sweet sorghum (Honeydrip)	30,609	220	30,616	219
Oats (Avon)	11,002	77	12,400	73
Triticale (TRI)	12,443	83	13,100	77

Maize: Growth rates of 328 kg/ha/days post-flowering have been measured, which is a conversion rate of 5.03%. Plot yields of 29,250 kg DM/ha have been achieved, representing a mean growth rate of 225 kg/ha/day for 130 days and a conversion efficiency of 3.53% from emergence to maturity.

Sweet sorghum: Total yield is higher than maize. Conversion efficiency of 3.5% from emergence to maturity is similar.

Oats: High conversion rates are achieved in winter and spring. Growth rates of 135 kg/ha/day for August (4.8% conversion), 199 for September (5.2%) and 246 for 21 days in October (4.9%) have been measured.

Triticale: Can achieve similar DM yields to oats but with less danger of lodging.

By growing two crops per annum, the efficiency of C₄-type tropical plants such as maize and sorghum hybrids, and the temperate cereal types such as oats and triticale, can be combined. The sweet sorghum Honeydrip (30,609 kg DM/ha) followed by Algerian oats (16,160 kg DM/ha), both crops being utilized as fine chopped silage, gave a total annual production of 46,769 kg DM/ha. This is approximately three times the yield of the better perennial pastures in irrigated Northern Victoria.

When harvested at an advanced stage of maturity for maximum DM production, fodder crops have relatively low protein and digestibility: i.e., maize or oaten silage, approximately 60% digestible DM, 1.2% N. However, because of their superior efficiency, they offer greatly increased productivity from our irrigated areas.

The potential for the use of crops to expand substantially the energy feed base for animal production from irrigated land is a significant prospect for the future.

1. Stockdale, C.R. and Martin, F.M. 1982. Aust. Soc. Agron. Conf. Wagga Wagga.
2. Martin, F.M. 1982. Aust. Soc. Agron. Conf. Wagga Wagga.