LIVESTOCK PRODUCTION IN CENTRAL MALI: FACTORS INFLUENCING GROWTH AND LIVESTOCK IN AGRO-PASTORAL CATTLE

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SUMMARY

Data on weight and growth of indigenous African cattle under a traditional management system are reported. In semi-arid central Mali (14°N, 6°W) calf birth weight was 16.6 kg, growth rates to weaning at seven months averaged 185 grams per day. Cows did not reach mature weights (230 kg) until after five years of age and work oxen did not achieve a mature weight of 297 kg until after six years. Effects of season of birth were significant on growth throughout life but effects of year of birth only persisted for nine months. Parity of cow, season and year had significant influences on post-partum weight. Seasonal changes in weight were severe for both work oxen (87 to 107% of mean weight) and for cows (88 to 110%). Over a seven year study period the decline in mature weights of oxen was 4% per year equivalent to about 80 kg over the period. For cows the decline was proportionately less severe (2.7%) these animals averaging 40 kg less in 1984 than they did in 1978. The slow growth rates, low mature weights and reduction in adult size is considered to be due to chronic overstocking on already denuded feed resources and to a decline in rainfall over the period. Current research programmes aimed at finding solutions to these problems are outlined.

INTRODUCTION

The phenomena of liveweight loss and subsequent compensatory gain have been well documented both for temperate (Wilson and Osbourn, 1960; Allden, 1970) and for tropical areas (Seebeck and Tullock, 1968; Walker, 1969; McLean, McCown, Little, Winter and Dance, 1983). In arid and semi-arid tropical conditions where seasonal changes are extreme both the quantity and the quality of the feed supply may fluctuate rapidly over a very wide range within a short time span. In these areas the onset of the rains, which may often be accompanied by intense storms, has been considered to be a period of nutritional crisis. Marked weight losses of up to 12% of liveweight have been recorded over periods of as short as two weeks (Walker, 1969; Goodchild, 1980). In Australia this weight loss has been called the "critical period" (Norman, 1967), in East Africa it has been described as the "green grass loss" (Payne, 1965) and in West Africa as "le crise de juillet" as this is the start of the rainy season in that area (Denis, Blancou and Thiongane, 1979). Almost all the empirical evidence for the early rains weight loss comes from experimental station work where stocking rates can be controlled (and usually are so at a relatively low intensity) and where losses in the preceding long dry season are usually as low as 8 to 12% of initial weight of mature or nearly mature animals. On communal African rangelands, which are often chronically overstocked at two or three times their estimated carrying
capacity, nutritional stress is a more fundamental problem. Animals are under-
nourished from before birth, throughout their growth period and at and following
maturity.

In African traditional husbandry systems cattle are multi-purpose animals and
provide, in addition to meat (which may indeed be a minor production goal),
milk and traction: they also act as a means of investment. Chronic undernutrition
and malnutrition lead to slow overall growth rates, late ages at maturity, poor
reproductive performance which is highly seasonal in spite of breeding being
uncontrolled (Wilson and Clarke, 1976; Wilson 1985) and to draught animals
being in too poor a condition to work effectively (Wilson, de Leeuw and de
Haan, 1983). These consequences of nutritional stress in animals are reflected in
the human population. In the mainly subsistence African economies, off-take rates
(either as meat for home consumption or as animals for sale) are generally less
than 10%, the milk supply is low and fluctuates widely (and human competition
for milk imposes a further stress on calf growth) and crop yields are suboptimal
due to late planting in the already too short growing season as a result of draught
animals not attaining full condition and strength until well into the rainy period.

This paper reports the results of studies on growth and liveweight changes in
cattle in a sedentary agro-pastoral system—defined by Wilson, de Leeuw and de
Haan (1983) as a system in which up to 50% of total household income is derived
from livestock or their products—carried out from 1978 to 1984. The study was
part of a pluridisciplinary systems study aimed at identifying major constraints in
the system prior to devising component research to overcome any such
constraints.

MATERIALS AND METHODS

Central Mali lies between 12° and 16° north latitude and 2° and 8° west
longitude. The climate is of the Sahel type with highly seasonal rain falling mainly
in June to late September. Most rain occurs in late July and throughout August.
The long-term annual average (1930 to 1976) is about 550 mm but since the start
of the Sahel drought of 1968 to 1973 precipitation has been considerably less and
in only two years in the period 1977 to 1983 did it exceed 400 mm (Table I). Mean
temperatures vary from 31°C in May and June to 23°C in January. Daily maxima
(37°C) are highest in April and minima (12°C) lowest in January. Humidity is
lowest in March and then increases rapidly prior to and throughout the rains to a
maximum in late August and early September.

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<td>21.8</td>
<td>3-6</td>
<td>28.7</td>
<td>7.3</td>
<td>31.0</td>
<td>9.8</td>
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<td>32.4</td>
<td>68.7</td>
<td>40.4</td>
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<td>41.4</td>
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<td>July</td>
<td>77.5</td>
<td>162.6</td>
<td>78.9</td>
<td>96.1</td>
<td>107.6</td>
<td>60.6</td>
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<td>August</td>
<td>177.3</td>
<td>149.2</td>
<td>141.4</td>
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<td>September</td>
<td>67.2</td>
<td>90.1</td>
<td>85.3</td>
<td>66.5</td>
<td>13.0</td>
<td>46.0</td>
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<td>448.7</td>
<td>410.9</td>
<td>342.2</td>
<td>364.3</td>
<td>337.5</td>
<td>165.3</td>
<td>351.9</td>
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TABLE I
Rainfall (mm) for Niono (14°15'N, 6°0'W), 1977–1983