

## NOTES

### A NOTE ON THE YIELD OF *TERMINALIA IVORENSIS* IN UMUAGWO, NIGERIA

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There are no reliable data on the growth and yield performance of *Terminalia ivorensis* in Nigeria. Therefore in 1980, a pilot project to monitor these characteristics was set up in Michael Okpara College of Agriculture, Umuagwo, 25 km away from Owerri, capital of Imo State of Nigeria.

*T. ivorensis* seedlings of about 15 cm in height, raised at the central Forestry Department nursery in Owerri, were transplanted in Umuagwo soil. The seedlings were planted at 2.5 × 2.5 m spacing, giving a total of 672 seedlings. In April 1986 and March 1989, forest inventories were conducted so as to ascertain the growth and yield performance of the species. Due to the small size and homogeneity of the plot, a total enumeration was carried out. A diameter tape was used to measure the girth of the tree at breast height. A Sunto Optimeter was used to measure the heights of the trees. In the exercise, all trees below 5 cm dbh were left out.

For optimum growth, *T. ivorensis* requires a relatively well distributed annual rain fall between 400 to 2500 mm, annual temperatures between 23 to 27°C and relative humidity not less than 50% in the dry months (Lamprecht 1983). *T. ivorensis* grows well on sandy well drained soil. Umuagwo, with an annual rain fall range between 1400 to 2300 mm, mean annual temperature of 27°C, and average relative humidity at 92%, provides a favourable site for *T. ivorensis*. Umuagwo's deep, red sandy loam over sandy clay loam soil with good drainage are preferred too.

As shown in Table 1, the productivity of the stand by the end of the first six years stood at 5 m<sup>3</sup> ha<sup>-1</sup> y<sup>-1</sup>; three years later, in 1989, the yield rose to 9 m<sup>3</sup> ha<sup>-1</sup> y<sup>-1</sup>. That is almost twice that in the period 1980 to 1986 (Tables 1 & 2). The low productivity in the first six years (1980-1986) was as a result of over crowding. Apart from favourable site factors, *T. ivorensis* is a light demanding species and should not be over crowded, bearing in mind that the plantation under review had a stocking of 2000 trees ha<sup>-1</sup>. According to Lamprecht (1983), *T. ivorensis* should be planted at 4 × 4 m spacing. Sander (1953) recommended 5 × 5 m or about 600 trees ha<sup>-1</sup>. In other words, the plantation has three times trees more than the required population.

**Table 1.** The yield of *Terminalia ivorensis* after 6 y of establishment in Michael Okpara College of Agriculture, Umuagwo

Diameter class (cm)	Frequency number	Mean diameter (cm)	Mean height (m)	Mean basal area (m <sup>2</sup> )	Mean volume (m <sup>3</sup> )	Yield per 0.4 ha (m <sup>3</sup> )	Yield per ha (m <sup>3</sup> )
5 - 9.9	129	7.5	7.2	0.004	0.017	2.19	5.48
10 - 14.9	95	12.5	9.5	0.012	0.068	6.46	16.15
15 - 19.9	19	17.4	11.4	0.024	0.164	3.12	7.8
Mean (Total)	= 243	10.0	9.5	0.008	0.046	11.8	29.43

**Table 2.** The yield of *Terminalia ivorensis* after 9 y years of establishment in Michael Okpara college of Agriculture, Umuagwo

Diameter class (cm)	Frequency number	Mean diameter (cm)	Mean height (m)	Mean basal area (m <sup>2</sup> )	Mean volume (m <sup>3</sup> )	Yield per 0.4 ha (m <sup>3</sup> )	Yield per ha (m <sup>3</sup> )
5 - 9.9	23	7.5	7.8	0.004	0.187	4.38	10.95
10 - 14.9	74	12.5	11.8	0.012	0.085	6.29	15.73
15 - 19.9	64	17.5	13.8	0.024	0.199	12.74	31.85
20 - 24.9	18	22.5	15.7	0.019	0.129	3.2	8.0
25 - 29.9	11	27.5	15.1	0.059	0.535	5.89	14.73
Mean (Total) =	190	16.1	14.0	0.0204	0.171	32.5	81.26

The high increment in yield in the last three years (1986 - 1989) was as a result of silvicultural operations. Within this period, the plantation was cleaned and thinned. It is hoped that further thinning there would increase the spacing to  $5 \times 5$  m as recommended by Sanders (1953). This would undoubtedly induce increase in girth.

### References

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## A NOTE ON ALLELOSPOLY AND TREE AGE UP TO WHICH INTERCROPPING IS FEASIBLE

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A multitude of benefits has been imputed to the agroforestry system of intercropping with trees (Lechner & Neumann 1966, Hesmer 1970). But owing to growing competition from the trees for light, water, and nutrients, intercropping without yield penalty is feasible only during the early growing period of the tree (King 1968). This effect has been termed allelospolly (Szezpanski 1977). Several studies have shown that with increasing age, the intercrop invariably sustains yield loss (Maghembe & Redhead 1982, Redhead *et al.* 1983). We carried out intercropping studies for three multipurpose trees, namely *Eucalyptus tereticornis*, *Casuarina equisetifolia* and *Leucaena leucocephala*, to determine their precise ages when allelospolly effect occurred.

The studies were carried out at the Forestry Research Station, Mettupalayam, India (11° 19'N; 76° 56'E; 300 m a.s.l.) from 1983 to 1986. The three multipurpose tree species