ridged treatment. Table 16 shows that 20 percent more yam tubers were produced in mulched than unmulched plots with least tuber yield measured in the unmulched ridge treatment. The beneficial effects of residue mulch may partly be attributed to favorable soil temperature and moisture regimes. Observations on soil moisture content made 40 and 90 days after planting indicated that unmulched ridges had the least soil moisture reserves.

Table 16. Effects of tillage methods and mulches on yam production (Onne, 1980).

	Ridge no mulch	Flat no mulch	Ridge plus mulch	Flat plus mulch
Length of tuber cm	20.7	20.7	23.5	21.7
Diameter of tuber cm	13.3[a]	13.9[a]	16.7[b]	17.1[b]
Yield t/ha	14.1	16.3	19	18.9

Effects of soil bulk density on root and shoot growth of cassava. A root-box study was conducted to investigate the effects of 3 soil bulk density treatments, 1.4, 1.6 and 1.8 gcm^{-3}, on cassava root and shoot growth. Cassava was grown in collapsable boxes 48 cm x 46 cm x 100 cm, with sides that could be removed for monitoring root growth at different stages. Measurements on root growth were made for cassava cultivar TMS30572 at 48, 78, 108, 132 and 185 days after planting. Root density, measured as length and dry weight, was not significantly affected by the soil bulk density treatments investigated. Neither were there significant differences in plant height, leaf area nor shoot dry weight. Cassava can withstand soil compaction more than grain crops such as maize, cowpea or soybean. Nevertheless, the shoot: root ratio was generally higher at soil bulk density of 1.6 gcm^{3} than other densities (Table 17). The optimum density for the high feeding: tuberous root ratio was 1.6 gcm^{-3}. These results imply that effects of soil compaction on cassava may be highly dependent on soil texture as the latter affects both the intensity and capacity factors for nutrient and water availability.

Effects of tillage methods and mulches on soil temperature regime and its effects on crop production. Thermal diffusivity, the ratio of thermal conductivity and volumetric heat capacity, generally increases with an increase in soil moisture content up to a certain value. The exact relationship depends on soil texture. Thermal diffusivity measurements were made for 20 different soils, and the relationship between soil moisture content and thermal diffusivity for some soils is shown in Fig. 12. In general, thermal diffusivity is higher in coarse-textured sandy soils than heavy-textured clayey soils. The regression equations between sand, silt and clay on thermal diffusivity are given in Table 18.

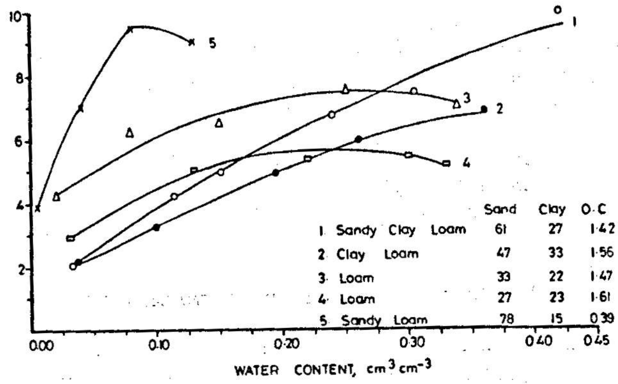

Fig. 12. Thermal differsivity of various soils as a function of the water content. Size of glass beads used 50-75 U.

Table 18. Regression equations relating thermal diffusivity, D ($cm^2\ sec^{-1}$) to percent sand, silt, clay or organic matter in a soil sample.

Simple	
1. $D = 0.0103 - 0.000148\ cl$	$r = 0.788^{**}$
Multiple	
2. $D = 0.01182 - 01099 \times 10^{-3}\ cl - 0.1680 \times 10^{-2}\ cm$	$r = 0.844^{**}$
3. $D = 0.0121 - 0.3066 \times 10^{-4}\ Si - 0.1104 \times 10^{-3}\ ci - 0.1479 \times 10^{-2}\ Om$	$r = 0.860^{**}$
4. $D = 0.001025 + 0.1104 \times 10^{-3}\ Sa + 0.798 \times 10^{-4}\ Si - 0.1479 \times 10^{-2}\ Om$	$r = 0.60^{**}$

Sa = Sand, Si = Silt, Cl = Clay, and Om = Organic matter.

Table 17. Effects of soil bulk density on cassava's shoot: root ratio and feeding root: tuberous root ratio.

	Bulk density 1.4		Bulk density 1.6		Bulk density 1.8	
Days after planting	Shoot dry wt / Root dry wt	Root dry wt / Tuber dry wt × 10 [4]	Shoot dry wt / Root dry wt	Root dry wt / Tuber dry wt × 10 [4]	Shoot dry wt / Root dry wt	Root dry wt / Tuber dry wt × 10 [4]
48	134.72	-	58.89	-	50.00	-
77	188.24	84.53	258.89	305.08	126.04	185.90
106	140.13	67.47	128.55	70.40	110.4	98.81
134	150.17	42.44	267.41	41.90	348.91	12.60
185	401.96	299.79	249.39	537.66	200.01	329.94