

A LONG TERM ROTATION TRIAL IN NEW BRITAIN, PAPUA NEW GUINEA

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SUMMARY

A twenty year rotation trial is described from the wet tropical lowland in New Britain.

Continuous cropping of sweet potato (*Ipomoea batatas*), taro (*Colocasia esculenta*), and peanuts (*Arachis hypogaea*) or cowpeas (*Vigna sinensis*) (narrow rotations) is compared with a one and a half year period of food crops rotated with a one and a half year period of food crops rotated with a one and a half year green manure crop (wide rotations). No cropping pattern has maintained yields of all crops at or near the original levels. The wide rotations are less bad than the narrow rotations. Fertility has dropped markedly, particularly in the narrow rotations.

RESUME

Un essai de rotation mené en vingt ans sur les basses terres de la Nouvelle-Bretagne a été exposé.

La culture ininterrompue d'*Ipomoea batatas*, de *Colocasia esculenta* et d'*Arachis hypogaea* ou de *Vigna sinensis* (rotations étroites) a été comparée à la culture de plantes vivrières sur une période d'un an et demie en rotation avec celle d'une plante verte cultivée avec application d'engrais sur un an et demie (rotations larges). Aucun des systèmes essayés n'a maintenu ou approché le rendement initial de toutes ces plantes. Les rotations larges ne sont pas aussi mauvaises que les rotations étroites. Il y a eu baisse sensible de la fertilité, surtout en rotations étroites.

RESUMEN

Se describe un ensayo de rotación, por veinte años, de las tierras bajas tropicales en Nueva Bretaña.

El cultivo continuo de camote (*Ipomoea batatas*), malanga (*Colocasia esculenta*) y maní (*Arachis hypogaea*) o chícharo de vaca (*Vigna sinensis*) (rotaciones cortas) se compara con un período de año y medio de cultivos para producción de alimentos rotados con año y medio de cultivos para forraje (rotaciones largas). Ninguno de los patrones de cultivo ha mantenido los rendimientos de todos los cultivos a los niveles originales o cerca de ellos. Las rotaciones largas son menos perjudiciales que las cortas. La fertilidad ha bajado mercadamente, particularmente en las rotaciones cortas.

INTRODUCTION

In Papua New Guinea sweet potato, taro, yams, bananas and the sago palm provide the bulk of the food for its two million inhabitants. A bush fallow farming system is employed in the lowlands and normally provides adequate crops. Under this system the cropping period is characteristically only about one year and the fallow period at least 10 years. However, as population increases, the fallow period is being reduced and the system becoming inadequate to provide sufficient food. So far this has occurred only in a few localities and has been alleviated by migration and some changes in farming systems.

In anticipation of such developments, a rotation trial in the lowlands was laid down in the early nineteen fifties and is reported here. The trial was near sea level at Keravat on the islands of New Britain at 4°21'S, 152°2'E. Annual rainfall is 2760 mm fairly evenly distributed throughout the year, although 1 or 2 dry months can be expected to occur in most years. The climax vegetation is lowland forest and the soil a young alluvial sandy loam derived from tuff.

METHODS

The trial has 7 rotational treatments (Table 1) each with a different sequence of 6 plantings. Each complete sequence of plantings is termed a cycle. Each cycle takes 3-3.5 years to complete. The first cycle of each treatment was planted in January 1954, and 19 years later in 1973 the trial is in its 6th cycle.

Each treatment is replicated 3 times in position. There are also 3 replicates in time, termed series. The 3 replicates within each series are associated in an incomplete block layout with 3 plots per sub-block. The 3 series were planted contiguously in the field.

Thus there are 63 plots in the trial (7 treatments x 3 replicates in space x 3 replicates in time (series)). Each plot being 9 metres square.

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