

# Cover crops on acid soils

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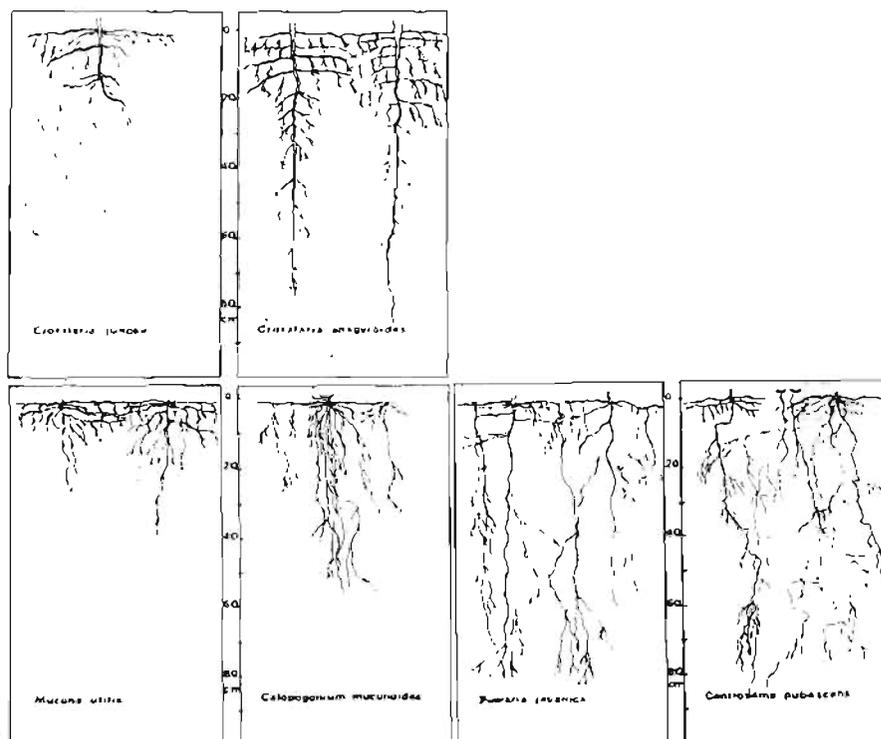
Experiences in the humid tropics

In the humid tropics, the leaching of nitrogen and other nutrients to the subsoil may occur throughout the growing season. Mixed cropping systems of shallow and deep rooted crops can therefore be advantageous. On acid soils maize may develop only shallow root systems; combination with deep-rooted cassava gives a better nutrient utilization than a monoculture.

To recover leached nutrients from the subsoil, deep-rooted cover crops in the crop rotation may be helpful. Leguminous food crops such as cowpea are shallow rooted. The ideal cover crop should form a rapid cover to protect the topsoil, produce much biomass, give a good weed control, form a deep root system and show a good nodulation.

In practice these requirements can seldom, if ever, be met by one species. Some experience with various cover crops is presently being obtained in Lampung, S. Sumatra, where *Imperata cylindrica* forms the major weed problem. Research is being conducted within the framework of a joint research project on nitrogen utilization between our institutes, sponsored by EEC and Dutch directorates of developmental cooperation. Remarks on the general performance of six cover crops is presented in the table; the root system is shown in the accompanying figure. Comparable results for S.E. Nigeria have been reported previously (see reference).

Species with creeping stems and fast initial development, as illustrated by *Mucuna* and to a lesser degree *Calopogonium*, give good initial weed



control. The erect *Crotalaria* species do not directly cover the soil but may shade out *Imperata* in the longer run. *Mucuna* and *Calopogonium* show a shallow root system, *Crotalaria* roots go deeper. The other species develop too slow to control all weeds initially, but may be interesting because of a deep root development (*Centrosema*) or good nodulation (*Pueraria*). Yield effects of cover crops on a subsequent maize crop are currently being investigated.

Root development of cover crops as observed from pinboard samples 8 months after sowing (*Mucuna* at 5 months).

Reference  
Kurniatun Hairiah and Meine van Noordwijk, 1986, Root studies on a tropical ultisol in relation to nitrogen management. Inst. for Soil Fertility, P.O. Box 30003, 9750 RA Haren NL., report 7-86

Table 1. Observations on cover crop development in Lampung, S. Sumatra, sown in January after the start of the rains; form: c = creeping, e = erect; initial growth: ++ = fast, + = good, 0 = slow; *Imperata* control: ++ = good, + = limited and 0 = poor; r = *Imperata* regenerating.

| Species                        | form | crop duration | initial growth | <i>Imperata</i> at 4 | control 8 months | Root system and nodulation                                  |
|--------------------------------|------|---------------|----------------|----------------------|------------------|---|
| <i>Mucuna utilis</i>           | c    | 5 months      | ++             | ++                   | +(r)             | shallow, many nodules                                       |
| <i>Calopogonium mucunoides</i> | c    | perennial     | +              | ++                   | 0                | rather shallow, few nod                                     |
| <i>Crotalaria juncea</i>       | e    | 8 months      | +              | +                    | ++               | deep branch root, few nod                                   |
| <i>C. anagyroides</i>          | e    | perennial     | +              | +                    | ++               | deep tap root, few nod                                      |
| <i>Centrosema pubescens</i>    | c    | perennial     | 0              | 0                    | +                | deep branch roots, few nod                                  |
| <i>Pueraria javanica</i>       | c    | perennial     | 0              | +                    | +                | shallow rhizomes, deep branch roots, nodules in subsoil too |