

ABSTRACT

THE survival of four "cowpea" rhizobia strains in two soil types (clay loam and bauxitic soils) undergoing drying at 37°C and/or 30°C was studied. A general increase in their numbers for up to twenty-four days after inoculation followed by a decline was observed in sterile soils. The survival of an indigenous "cowpea" rhizobium isolate in four sterile soils collected from different locations in Jamaica was also examined and the same survival pattern was observed. Moisture depletion reduced rhizobial numbers since while "cowpea" rhizobia were recovered after long-term storage (six months) in local soils, percentage survival was much lower than after two months survival in soils. However, rhizobia survived better in drying soils than in moist soils at 30°C. In general, except for strains JRW3 and IRC291, rhizobial survival during short-term storage (two months) was similar in both soil types at the temperatures examined. Increased temperature had no effect on survival of the four strains in the clay loam while in the bauxitic soil survival of the indigenous strains JRC29 and JRW3 was significantly reduced. Nutrients added to sterile soil inoculated

with rhizobia resulted in growth of rhizobia from day ten up to day twenty-four. While this growth had no effect on survival of these strains at 30°C, it allowed the rhizobia to survive drying at 37°C better than strains that were not allowed to grow before drying at this temperature.

In non-sterile soils no increase in rhizobial number was observed. Survival was better in the bauxitic soils than the clay loam soils at 30°C: all rhizobia strains declined gradually in their numbers in clay loam soils. Antibiotic resistant mutants although not as effective as the wild-type strains were found suitable for ecological studies.

All four "cowpea" rhizobia strains survived well in Jamaican peat since greater than 10^7 cells per gram peat survived after six months. The indigenous strains survived better than the introduced strains however; greater than 10^8 cells per gram peat were recovered at that time. Storage temperature had little effect on the survival of the rhizobia in peat except after four months when survival was better in peat stored at 4°C. Survival

of "cowpea" rhizobia was not significantly affected when peat was mixed with one percent sucrose. However, the chances of contamination of the peat was increased.

The survival of all "cowpea" rhizobia strains on broth inoculated seeds was improved significantly when ten percent sucrose was used as a protectant. Increasing the concentrations of sucrose used improved rhizobial survival on peat inoculated seeds. Survival of rhizobia on peat inoculated seeds stored at 4°C was significantly better than survival on seeds stored at 30°C. The average logarithmic decline showed that while both peat and sucrose protected rhizobia on seeds, peat was more protective.