INTRODUCTION

The study of Desert vegetation has revealed spatial and temporal patterns characteristic of these ecosystems. Climate and topography create these pattern's directly, by limiting productivity, density and composition. Indirect influences are manifested in patterns of soil formation and fertility. By measuring pattern an understanding of how plants function has been gained, which has allowed reclamation procedures to be introduced which are based on scientific study that are in sympathy with the environment. Woodell, Mooney & Hill (1969) demonstrated a positive correlation between the density of 'individuals' of *Larria divaricata* and rainfall, over twelve sites in the Sonoran and Mojave deserts. The availability of moisture is the major factor that determines both the spatial distribution and the abundance of plant species, therefore the availability of water is regarded as a limiting factor within such environments. Under such conditions the regular distribution of plants is considered to be imposed by a competitive mechanism which produces 'regular distribution' on the population of plants concerned (Anderson 1971). (Cody 1986)suggested root system morphology was a significant factor in influencing spacing patterns. He further went on to suggest that sites with uniform and level substrate, spacing patterns both within and between species are highly non-random. Much of the work carried out during the sixties and early seventies produced numerous qualitative description of regular desert shrub patterns but there appears to be little quantitative evidence of regular patterns occurring (Anderson 1971).

Grieig-Smith & Chadwick (1965), Beals (1968) and Barbour(1969) parodied some evidence for regular distribution. Anderson (1971) suggests that if low rainfall is associated with competition between adjacent plants and that in turn this produces regular spatial patterns it is surprising that so great a diversity of pattern-regular, random, and clumped is detected in the field. The work outlined above gave rise to the idea that regular patterns off plant distribution were therefore driven by the individual plants need for water.

This in turn produced a pattern which meant that plants had spaced themselves in such a way that they could utilise all available moisture. Spatial patchiness of rain may occur in deserts due to 'convective storms' with some areas receiving several centimetres of rain adjacent to areas that receive none. Deep rooted plants which in this context tend to be shrubs, are able to survive throughout the year and into proceeding years with very little rainfall to sustain them.

To the casual observer spatial variation in desert vegetation seems to be associated with land form patterns, but on a broad scale of observation vegetational assemblages would likewise seem to be related to rainfall variation (Ayyad 9181). In local vegetation patterns and areas of rapid topographical change, plant spatial variations are more explicable in relation to land form patterns (Goodall & Perry 1979). Through there influence on microclimate and edaphic factors, landforms control, moisture availability, salinity and soil stability in arid deserts. Moisture availability is considered to be responsible for the largest component of variability in the spatial distribution of species (West & Ibrahim 1968).

The classification of desert vegetation is commonly related to soil physical characters, nature of surface and topographic features which all act through modifying the amounts of available moisture. There is a further consideration apart from moisture availability that is of fundamental importance to plant growth, that of nutrient availability. Because of the aridity of desert ecosystems it was understandable that so much effort should have been put into investigating the role of moisture in such ecosystems. It has always been acknowledged that nutrient availability is an essential component of temperate, tropical and other ecosystems.

The idea that 'islands of fertility' exist within desert ecosystems was first suggested by (Garcia-moya and McKell 1970). Because biomass production is low, organic matter input into the soil is likewise low, such inputs tend to be confined to particular areas. By virtue of this input micro-organisms are likewise confined to such areas. (West and Ibrahim 1968, Cody 1986, Cody 1989