LEGUME PERSISTENCE PROBLEMS IN HAWAII:
AN OVERVIEW

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SUMMARY

Lack of legume persistence in Hawaiian pastures is a perennial problem for our ranchers. Problems of establishment, nutrition, competition, and persistence in association with aggressive grasses and weeds, as well as problems of grazing management, have caused concern about the use of legumes. We have to work with a wide range of soil and climate environments which are separated by short distances. A 1-km shift along any given elevation contour may result in as much as a 1000-mm change in rainfall, a change in the soil order with their concomitant changes in soil chemistry and a marked change in radiant energy available at the canopy level. Such rapid shifts in the environmental gradients render much of our pasture research site specific.

VEGETATION ZONES AND PASTURES

The eight major islands forming the state of Hawaii are comprised of over 16 885 km$^2$ of land area and lie at the southeastern end of a chain of islands and shoals more than 2567 km long. Each of the islands was originally built as one or more lava domes, and each owes its shape primarily to volcano building. Parts of the islands have been more or less modified by erosion under strongly localized conditions.

Five general types of vegetation occur in the Hawaiian Islands; shrub, forest, parkland, bog, and moss-lichen. These formations do not exist on all of the islands nor are the altitudinal limits of the formations the same on all islands. These formations tend to occur in regular patterns on the mountain slopes as one progresses from the very dry leeward side of an island to the wet windward side and, as one goes up the slopes, changing from tropical conditions at sea level to a temperate climate in the highlands and to a frigid climate at the tops of the high mountains.

Types of forages grown and their productivity are highly dependent upon the natural features of the landscape interacting with the climate and the soil. Ripperton and Hosaka (1942) incorporated climate, vegetation, soils and geographic features by classifying the lands of Hawaii into a series of Vegetation Zones which could be used to assess the potential forage productivity of various areas. Briefly, the zones and their pasture characteristics may be described as follows:

1. Zone A occurs on the lee sides of the islands or on low windward lands having no mountain background high enough or close