

INTRODUCTION

In recent years, artificial insemination, hereafter referred to as "A.I.", has received increased attention in most dairy countries of the world. Undoubtedly, it is one of the most useful tools which have been made available to the livestock breeders.

The pioneers of investigations on A.I., among them Spalanzani, Rossi, Sir Everett Millais and Ivanoff, have always received due credit for their work in this field. The recognition of the possible application of A.I. in improving tropical animal husbandry was accompanied by the need for basic experimental work with regard to its various aspects - particularly reproductive physiology of tropical species and the actual technique of this practice.

In Kenya, as in England, Denmark and the U.S.A., investigations were undertaken after the war. Between 1941 - 1946, preliminary work had begun in many areas in the tropics, including Trinidad, Jamaica, the Philippines and Brazil. The earliest attempts at introducing A.I. often met with disappointing results. In most cases this was due to the prevalence of genital diseases and reproductive disorders - important features in unimproved tropical species.

So far, most of the work in the tropics has been carried out with cattle and buffaloes. Recent work indicates the tendency to build up new breeds from indigenous cattle by the introduction of varying degrees of zebu blood with the use of A.I. This has been practised for many years in the Philippines, Jamaica, Trinidad, the southern U.S.A. and in Queensland. At present many centres of tropical research are pursuing fruitful investigations on the fundamental problems of the technique.

This reading project has been divided into two parts. The first (Part A) covers the Physiological aspect, and is concerned with research work, carried out in the tropics and adjacent regions on all aspects of A.I. The second (Part B) is a regional survey of the tropical areas where A.I. has been introduced. It may be said that the extent to which A.I. has been used in developed territories is directly related to the relative importance of livestock in the agricultural economy of the area.

Although spermatazoa are produced throughout the year in farm animals, the rate of spermatogenesis and semen quality are greatly influenced by climatic changes. Available literature does show confliction of results, but apparently the balance hangs in favour of definite temperature and seasonal effects.

The effect of temperature on cattle has been investigated by several workers, notably Rhoad (1936-40), Bonama (1940), and Daubrey (1942). European cattle have been found to respond greatly to high external temperatures. Bonama recorded a positive correlation between high body and scrotal temperatures under hot environmental conditions. From the results obtained by Gunn et al in Queensland, Anderson suggests that very low daily minimum temperatures, as experienced in Tropical plateau countries with a large diurnal temperature range, may offset the otherwise harmful effects of high daily maximum temperatures on spermatogenesis. The period of exposure, apart from the actual temperature of exposure, appears to have a greater effect on grade than on Zebu cattle (4).

Temperature effects on spermatogenesis has been investigated at varying altitudes in Peru. The reduction in optimal biological properties at high altitudes may be due to a transitory inhibitory action of anoxaemia on spermatogenesis (4).