

INTRODUCTION.

The problem of weed control is closely linked with the environmental conditions of the area under consideration. The reason for this, is that the habit of any plant responds to environmental conditions, and without a knowledge of such conditions and their effect upon the plant, it is not possible to understand the life cycle fully.

An attempt to eradicate a weed without a proper knowledge of its life cycle, may lead to a wastage of money and energy.

Weeds with naturally wide ranges of environmental conditions are more liable than others to show variation of growth habit. Certain widely distributed weeds and amongst them the sedge Nut Grass, have received attention from workers all over the world. The methods of eradication recommended by these workers can only be used as an indication of the possibilities that exist. Reports may be accurate for the locality and conditions where the work was carried out, but are liable to differ considerably between themselves, and cannot be relied upon for a different set of conditions.

Weed control should be directed against a weed at that stage of its life cycle, when it is most likely to be responsive to treatment.

Cultural methods of weed control must be considered with due regard to economy, and the policy of the holding, which is being examined. Where conditions of cultivation are highly intensive and the area is limited, it is possible to expend more labour and capital on weed destruction than would otherwise be economical.

This work was designed to investigate the control of the more serious weeds of the farm of the Imperial College, by cultural methods. The weeds selected were:-

from 1. Nut Grass. *Cyperus rotundus*, Linn. A sedge.

2. Bahama Grass. *Cynodon dactylon*, Pers.

A creeping perennial grass.

3. Fowl Foot Grass. *Eleusine indica*, Beauv.

In this investigation an attempt has been made to evolve a suitable method of destroying the weeds by cultural methods, at those periods in their life histories that are most likely to yield to treatment, after investigating their means of propagation and spread. It aims at avoiding wasteful and expensive cultivations, and provides information about the habits of the weeds under the conditions of the investigation. applied in the cultivations against weeds. For these reasons it has received more attention than other weeds in this work.

The period of the investigation was limited to nine months, so that it was not possible to study the life cycle of any weed over a whole year. During the previous years there had been exceptionally high rainfall figures, while the beginning of the experiment was carried on under very wet conditions. The advent of the dry weather about half way through the period of investigation split the time into rough halves, so that the period for study of any one factor under constant conditions was further limited.

Certain features of the College Farm have an important bearing on the weed population. There is a relatively large amount of work carried on over the area, which under the tropical conditions can raise many crops in each year. This together with the fact that much of the area is devoted to students' experiments means that the land is constantly being worked, and periods of idleness are few and short. The recurrence of crops in the seedling stage on one piece of land leads to a great amount of cultivation against weeds, which would not be applied so intensively on an area where only one crop is raised each year. The preparation of the tilth for the sowing of these crops also means more working of the soil, so that those weeds which are able to spread by means of the fracture of their underground portions are especially suited to the system, as long as their aerial portions are able to develop

from

PART I.
from time to time sufficiently to feed and stimulate the subterranean parts.

In this investigation an attempt has been made to evolve a suitable method of destroying the weeds by cultural Botany and Habit. methods, at those periods in their life histories that are most likely to yield to treatment, after investigating their means of propagation and spread. It aims at avoiding wasteful and expensive cultivations, and provides information about the complicated system of vegetative units inter-connected by means of rhizomes. habits of the weeds under the conditions of the investigation.

The main unit is the tuber, this by producing a vertical rhizome from one of its buds gives rise to the aerial portion or shoot. The shoot has a thickened base termed the basal bulb, and gives rise to the solitary inflorescence. The basal bulb is able to produce lateral rhizomes, which may develop into tubers or aerial shoots. The tubers themselves also produce rhizomes which can produce either another tuber or ascend to produce an aerial shoot and its basal bulb. The system of aerial shoots, basal bulbs, subterranean tubers and their connecting rhizomes is said to behave as a single physiological unit, exhibiting the phenomenon of Apical Dominance. (2). A single buried tuber must establish an aerial connection before it can develop a rhizome destined to form another tuber. The growing point of the rhizome is extremely hard and capable of penetrating hard compact soil. Once the soil surface has been penetrated, the aerial shoot commences to develop the green glaucous leaves, the basal bulb forming simultaneously. The leaves 4 to 6 in number attain a height of 3 inches to a foot, and are erect in habit. The inflorescence is borne on an erect and rigid green stem, which is triangular in cross section, and about 9 inches in length. It is an umbel of spikes a rich chestnut colour when fresh.