A LIST OF THE MORE IMPORTANT INSECT PESTS OF CROPS IN THE NYASALAND PROTECTORATE.

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The following paper gives a list of those insects of economic importance which have been collected or bred from various crops in Nyasaland during the first three months of the planting season 1911-12 and the whole of the season 1912-13. No attempt has been made to describe the various species mentioned, but their actual economic importance is stated in each case, so far as it has been possible to ascertain it during so short a period. All insects have been included as pests which have been found to feed on any particular crop in sufficient numbers to justify their inclusion in that category. In many cases the actual damage done may be slight, but at any time one or all of those species which feed regularly on crops may assume the position of dangerous pests, and so insects of apparently minor importance are included with those of definite and proved powers of destruction. The insects of first-class importance, which annually inflict heavy losses on the planters, are ten in number. These ten are confined to cotton, tobacco and maize, of which cotton is the worst sufferer, since it is attacked by a greater variety of insects than any other crop that has come under the writer's notice. Except where the contrary is specially mentioned, insects included in this paper are from the Shiré Highlands.

ORTHOPTERA.

Acridiidae.

There are two insects of this family which are really troublesome. In both cases they eat the leaves of young tobacco plants in the nurseries. The injury done is not really very great at any one time, but the aggregate damage during the season is fairly considerable. These two species are :—*Maura bolivari*, Kirby, and a species of *Chrotogonus*.

The other species are collectively destructive in varying degrees. In the planting season 1911-12 ACRIDIIDAE were very troublesome amongst freshly planted tobacco; in the present season 1912-13 their depredations were hardly noticeable. *Acrida turrita*, L., was an exception to the above statement, as it was committing a fair amount of havoc on an experimental plot of Turkish tobacco, in the Lower Shiré District. The brightly coloured *Zonocerus elegans*, Thunb., also occasionally becomes a minor pest.

The remaining species, so far as at present known, are :—*Catantops opulentus*, Karsch, *C. solitarius*, Karsch, *C. vittipes*, Sauss., *C. melanostictus*, Schaum, *Morphacris fasciatus*, Thunb., *Oedaleus citrinus*, Sauss., *Gastrimargus marmoratus*, Thunb., *G. wahlbergi*, Stål, *Acrotylus patruelis*, H.S., *Oxyrrhypes proceru*, Burm., and *Acridium lineatum*, Stål.

Gryllidae.

Brachytrypes membranaceus, F., is sometimes troublesome in cotton fields from its habit of eating the roots of cotton plants. It is fairly common, but not a serious pest at present.

LEPIDOPTERA.

Lepidopterous larvae are the most destructive pests in the country, the three boll-worms being annually responsible for a tremendous amount of damage, and the NOCTUIDAE easily take first place, causing a greater loss to crops than any other family.

Noctuidae.

Diparopsis castanea, Hmp., (The Red Boll-worm) is a major pest of great importance and occurs all over the Protectorate.

Chloridea obsoleta, F., occurs everywhere in company with *Diparopsis castanea*, and besides destroying the bolls and flowers of cotton, attacks maize, tobacco seed-pods, and chick-peas.

Earias insulana, Boisdu., occurs as a pest on cotton, but does not appear to be quite so serious as either of the foregoing, owing perhaps to the fact that it is heavily parasitised by an ichneumon. It has also been found on garden Hibiscus. It is generally distributed all over the Protectorate.

Euxoa segetum, Schiff., comes next in order of importance, and is an annually occurring pest which is responsible for much loss in the tobacco fields, during January and February, by cutting the stems of the plants.

Prodenia litura, F., is chiefly a pest in tobacco nurseries, but occurs also on cotton and maize and was once found feeding on tea. It is a fairly serious pest to young tobacco.

There is a number of Noctuid larvae which are all more or less harmful to cotton, by eating the leaves during the first stages of its growth until the appearance of the flowers. Their attacks last from December to the middle of March in the Shiré Highlands. The species include *Plusia orichalcea*, F., *Cosmophila erosa*, Hb., *Gonitis sabulifera*, Guen., *Plusia chalcites*, and *Acontia graellsii*, Feisth. *Busseola fusca*, Hmp., is one of the worst pests in Protectorate, causing a great annual loss in the native gardens by boring in the stems of maize and millet.

Pteronycta fuscata, Hmp. (gen. et sp. nov.) is at present very uncommon, but should it increase in numbers it would be capable of doing a great deal of damage. The larva when about to pupate eats half-way through the stem of a cotton plant and forms its cocoon in the place thus excavated. A very slight wind causes the cotton stems to break at the weakened part and the plant perishes.

Limacodidae.

Parasa vivida, Walk., is an occasional pest on coffee leaves and is very destructive when it does make its appearance.

Lymantriidae.

Heteronygmia leucogyna, Hmp., is a very serious and regular pest on mahogany (*Khaya senegalensis*). During the present year the mahogany plantations near Zomba were almost entirely defoliated by it.

Pyralidae.

Sylepta derogata, F. The cotton leaf-rolling caterpillar appears to be rare in the Shiré Highlands, at least in the Zomba District; further north, on the Lake shore, it is much more prevalent and is there a serious pest. The larvae are heavily parasitised by one of the CHALCIDIDAE.

Tineidae.

There are two species of TINEIDAE which are widely spread and destructive.

Phthorimaea heliopa, Lower, is a stem-borer of young tobacco, and is a very serious pest in the tobacco nurseries.

Gracilaria sp. nov.? The larva mines in the leaves of cotton and is a common insect, but is not very destructive, as healthy plants seem to be able to overcome its attacks without great difficulty. It would be a serious pest to cotton struggling against adverse conditions.

Nymphalidae.

Hypolimnas misippus, L., occurred once as a pest during last season, when in one cotton field the larvae were defoliating the plants. On this occasion they were present in large numbers, about a dozen feeding on a single plant at one time.

COLEOPTERA.

Only a few species of Coleoptera are, so far as the writer can tell at present, of any great economic importance. Certain species while very common on various crops are not particularly harmful.

Lagriidae.

Lagria villosa, F., is moderately destructive in vegetable gardens to leguminous plants, eating both flowers and leaves.

Galerucidae.

Ootheca mutabilis, Sahlb., occurs on cotton, leguminous crops and cucurbitaceous plants. It is especially destructive to the flowers of native pumpkins.

Diacantha conifera, Fairm., also occurs on cucurbitaceous and leguminous plants.

Asbecesta cyanipennis, Har., is destructive in the adult form to leguminous plants by eating the leaves. It is not, however, a very serious pest.

Pachytoma gigantea, Ill., was found to be troublesome in the nurseries of the Mlanje cypress plantations on the top of Zomba Mountain. It was committing a fair amount of damage by eating the growing points of the young trees.

Tenebrionidae.

Zophosis sp. is a very minor pest in the adult form on cotton and tobacco. *Gonocephalum simplex*, F., is also destructive in a slight degree in the tobacco fields.

Dermestidae.

Dermestes vulpinus, F., is a common household pest.

Meloidae.

Mylabris tricolor, Gerst., *M. amplexans*, Gerst., *M. discincta*, Bert., *DeCATOMA catenata*, Gerst., are all destructive flower-eaters, occurring on cotton. *Ceroctis trifurca*, Gerst., eats the flowers of soya and velvet beans.

Curculionidae.

Apion armipes, Wagn. The larva bores in the stems of cotton plants, causing them to swell at the point of irritation and frequently to break at the first high wind. This is an insect with considerable powers of destruction, and apparently common all over the Shiré Highlands. *Calandra oryzae*, L., is very destructive to stored maize and rice. A species of *Isaniris* is a general, but not very destructive, pest on cotton, the adult form eating the leaves.

Coccinellidae.

Epilachna dregei, Muls., *E. hirta*, Thunb., and *E. paykulli*, Muls., are all major pests in vegetable gardens. *Chilomenes lunata*, F., preys on the cotton aphids, and is an extremely useful insect.

Cassididae.

Cassida gibbipennis is a minor pest on leguminous plants.

Nitidulidae.

Epuraea sp. has been found eating the stamens of cotton flowers; a minor pest.

Ptinidae.

Lasioderma serricorne, F., bores in cigars and cigarettes.

HYMENOPTERA.**Tenthredinidae.**

Athalia sp. A major pest on turnips and cabbages; a very destructive species.

RHYNCHOTA.**Aphididae.**

There appear to be four species of APHIDIDAE which may be accounted pests of some importance.

Aphis gossypii, Glover, is very troublesome on cotton in certain seasons, especially those marked by excessive rainfall. There are two other species which are very destructive to cabbages and beans respectively. The former (*Aphis brassicae*, L.) is covered with a waxy secretion which adds to the difficulty of its extermination by means of contact poisons. The Bean Aphis is a dark green species with the legs banded with white. The fourth species, *Cerataphis lutaniae*, Newst., was found on *Raphia vinifera* in the Botanical Gardens at Zomba.

Coccidae.

Pulvinaria jacksoni, Newst., occurs occasionally on cotton, but in small numbers.

Coreidae.

Anoplocnemis curvipes, F., causes a certain amount of injury to cotton plants in some districts by sucking the stems. It has been found puncturing the young tender shoots of mahogany in the plantations near Zomba.

Pentatomidae.

Antestia variegata, Thunb., damages coffee berries to a considerable extent. *Atelocera stictica*, Westw., sucks the new shoots of mahogany.

Pyrrhocoridae.

Dysdercus nigrofasciatus, Stål, is a major pest of cotton, which it damages both by sucking the seeds and by staining the lint. It is generally distributed in the Protectorate. *Odontopus confusus*, Dist., attacks cotton in the same way, but appears to be more limited in its distribution, occurring only in the low-lying hot districts.