ANNUAL REPORT OF THE SENIOR ENTOMOLOGIST DEPARTMENT OF AGRICULTURE, STOCK AND FISHERIES 1952-1953

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THE following is an account of the work carried out by the Entomological Section during the financial year 1952-1953.

A limited amount of survey work has been done during the period by Messrs. Charles Barrett and J. H. Barrett, principally in the form of *Sexava* inspections, although some general entomological inspections and collections were also carried out to a small extent. Some three and a-half months were spent abroad by the writer during the period in Mauritius and Zanzibar looking for Rhinoceros Beetle parasites and Giant Snail predators. Apart from the above, the work has generally been in the nature of short-term investigations which could be brought to some degree of completion without being affected by possible staff deficiencies or changes.

Investigations on the principal pests are discussed in separate sections, while observations on minor pests are grouped under crop headings.

(1) MAJOR PESTS.

(*a*) *Cacao Capsids.*—

There is still no record of the Black Capsid (*Parabryocoropsis typicus*) outside the Gazelle Peninsula, although it has been recorded from an increased number of plantations within the area, in some instances the damage having been rather severe and resulting in considerable fruit loss. The Red Capsid (*Pseudodoniella pacifica*) has also been recorded in large numbers in some parts of the Peninsula, usually in somewhat elevated locations. Most of these latter occurences have been in Native plantations. On Keravat, only an occasional specimen of this species has been taken during the period, while the Black Capsid continues to be the cause of substantial losses although there is now a marked variation in the population from one block to another.

Some progress has been made in determining the life history details of *P. typicus*. However, the species, and especially the adult, is extremely fragile and will stand little handling. The nymphal stage is relatively hardy and will survive readily in specimen tubes on small cherelles. The egg stage is also difficult to handle. While the females will oviposit readily in cages on young choupons, it has not yet proved possible to induce these eggs to hatch even if the cortex is left intact on the branch. This appears to be due, among other causes, to the rapid breakdown of the tissue, shrinkage, mechanical obstruction caused by fungal hyphae and the exudation of mucilage. The only way it has been possible to induce the eggs to hatch has been by caging random-caught females on pods in the field and examining them daily until the eggs hatch. This is a lengthy process, particularly as there is no certainty that the females are ready to oviposit, or that they will oviposit in the 24-hour period during which they remain on the pod. So far, several dozen eggs have hatched in this manner and the incubation period is, on the average, fourteen days, with extremes of twelve and seventeen days.

As mentioned above, the nymphal stages are comparatively hardy. There are five instars during the developmental period which lasts from ten to fifteen days. The first instar lasts from one to two days. A proportion of the first instar nymphs appear to do virtually no feeding before undergoing an ecdysis, while others do considerable feeding and do not moult until the end of the second day. The

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second, third and fourth instars take from two to three days consistently while the fifth is the longest, ranging from three to five days.

As yet little information has been ascertained about the adults. Under our primitive laboratory conditions, they fail to remain alive for more than a few days, which is insufficient to allow even the commencement of egg-laying. The male is more fragile than the female and normally dies after one to three days in any type of indoor cage. The maximum period a female has survived is eleven days, during which twenty-six eggs were deposited, commencing six days after emergence. The only method of obtaining reliable data about the adult Capsids appears to be to house them in large cages in the field on pods *in situ*. This has been started but has not given any pronounced results so far. Even under such conditions, the survival rate is low, and large numbers of pairs will have to be dealt with before the results are acceptable.

Various types of population counts have already been initiated but have not been in operation sufficiently long to indicate trends. The types of counts being carried out include : (1) normal population variation, (2) effect of shade on population, (3) rate and method of re-entry into blocks free of Capsids and (4) regression or development of Capsid " pockets ".

During the past prolonged wet season, losses of Cacao on Keravat due to the Capsid, either directly or indirectly, have been rather high. No suitable method of assessing this loss has yet been devised, but it is considered that the overall loss on the Station would be of the order of ten to fifteen per cent., while on some blocks (406, 506, Criollo, etc.), this figure would be between thirty and forty per cent., with individual trees losing up to eighty per cent. of their fruit at all stages of development and giving the impression that they may be especially susceptible to attack. While much of the damage is due to the Capsid alone, the wet season has undoubtedly greatly increased necrotic areas left by the Capsids' feeding. There is a possibility that the small Membracid, *Omiodes* sp., may also be responsible for allowing the entry of this fungus.

Observation on the feeding habits of the Capsid adults and nymphs shows that they are capable of making from forty to more than seventy feeding punctures in twenty-four hours. As this tissue soon dies and shrinks, the mechanical effect alone, especially on partly grown pods, must be severe.

Little advance has been made with experimental work on the field control of this species. In the insectary, the adult is susceptible to any insecticide that has been tried, but the significance of this is very doubtful owing to its known short life in captivity. Complete defruiting of a heavily infested block (405) has so far provided almost complete immunity for seven months. A heavy dusting of half the block with Gammexane No. 10 dust produced no added effect. It has, however, indicated that, while the adult Capsids will feed quite readily on young flush, they do not appear to oviposit there yet under field conditions.

A number of trials have been carried out with a variety of materials to obviate the necessity of removing seed from pods prior to sending them to Capsid-free areas. These are not quite complete yet owing to the current absence of egg-bearing pods in numbers sufficient to run a final trial using a Toxaphene dip. It is, however, indicated that either Phosfone or Toxaphene dips, to which a small proportion of Dispersible D.D.T. powder has been added, constitute a satisfactory treatment. They are simple to prepare and easy to apply. They must be treated with due caution on account of their poisonous nature and they must be used while still fresh. Nymphs have emerged from untreated pods for as long as eleven days after a trial has been in operation, despite handling during daily examination.

(*b*) *Rhinoceros Beetles.*—

This pest continues to cause anxiety and increasing damage in the parts of the Bismarck Archipelago where it is already established. However, there is no record of its having spread to new areas during the past twelve months. The areas already affected are the Gazelle Peninsula of New Britain, New Ireland, Duke of York Islands and Tinguan Island, west of New Hanover. The fact that it has not spread further is remarkable in view of the multiplicity of inter-island shipping and the lack of an inspection service. In the Gazelle Peninsula there has been some spread along the Bainings plantations, although the degree of attack is still very slight, while along the east coast signs of the beetle's attack still diminish rapidly beyond Kokopo. In the outer plantations of this area the main damage is done to young palms by *Scapanes*.

The two indigenous species of Rhinoceros Beetles (*Scapanes grossepunctatus* and *S. australis*) have been in evidence in a number of localities, although they are more obscure in their attack since their feeding is confined principally to palms up to the time of bearing. The Elephant Beetle (*Xylotrupes gideon*) has been in evidence elsewhere, often in large numbers, but observations and cage trials have again failed to implicate it in any serious damage to coconuts. Several other Dynastids have been taken on palms during the past year, but in no case is there reason to believe that their presence is other than incidental.

The principal damage by the Asiatic Rhinoceros Beetle is occurring among young replanted or self-sown palms, although many mature and ageing palms are being killed by continued depletion of leaf area, entry of secondary fungi, etc. In the Oil Palm Block at Keravat, the mature palms are dying off at the rate of five per cent. annually, while young palms are being killed off at more than twice this rate. In addition to killing young palms, many badly-damaged ones appear to be delayed in reaching bearing age by as much as two to three years.

Work on this species lately has included the introduction from overseas of two species of Scoliid parasites. This was done between 15th September and 22nd December, and involved sending *Scolia oryctophaga* from Mauritius and *S. ruficornis* from Zanzibar. The latter was considered to be the most likely species to establish itself, and six weeks were spent by the writer on Zanzibar Island collecting and shipping the wasps. The wasp population was rather less than normal and some difficulty was experienced in despatching 600 females and about 50 males. For some reason that was not apparent, the survival rate declined with successive shipments, but a total of 250 living specimens, practically all females and mostly vigorous, was released at several selected sites in the vicinity of Rabaul. Two satisfactory liberations of approximately 100 wasps each were made at Keravat and Kurukukaul, which should be adequate to permit establishment. Of several very much smaller liberations it was claimed that the wasps were seen returning to the compost heaps several days after release. It is not likely to be known whether the wasps will establish themselves until one or two years have elapsed.

The collection of *Scolia oryctophaga* was done during a two-weeks' stay at Mauritius. This occurred at the end of the wasps' annual appearance and it was not possible to ship more than 130 females and 30 males. Of these over 80 survived the trip and undoubtedly these would have been mainly females. These were liberated near compost piles on the Catholic Mission Plantation, Kinigunan, in the Kokopo District.

As *Oryctes* is present in widely scattered centres in the island area, additional shipments of the wasps are desirable Accordingly, arrangements have been made to have these forwarded when they are again abundant in their natural habitats. It is expected that the first shipment of *S. ruficornis* will arrive during July and it is

intended that this should be liberated at a site in New Ireland. While it is doubtful whether it will be possible to establish *S. oryctophaga*, it is proposed to make further liberations at Kokopo, as and when shipments come forward.

To date, three dustings have been done of the young palms in the Oil Palm Block at Keravat but with no obviously beneficial results. The most recent application consisted of Water Dispersible (two and a-half per cent.) D.D.T. in pyrophyllite applied to the axils of the fronds by hand. It is intended to continue with this treatment for at least four more applications at approximately quarterly intervals. In the young coconut block at Keravat, the mortality has been of the order of eighty-five per cent. using no control measures, indicating that, in an area of high *Oryctes* density, it is virtually impossible, and certainly uneconomic, to raise coconuts to maturity without some attempt at controlling the beetle. It should be added, however, that some of this mortality in this instance is due to debility following varying degress, often almost complete, of defoliation by the common field grasshoppers, *Valanga* sp. and *Austracris* sp. Also, some of the initial mortality was undoubtedly due to the fact that planting was immediately followed by a very dry spell. When this block has been replanted, it is proposed to run a trial including regular hand-picking and treatment with various insecticides to see whether, and at what cost, satisfactory establishment can be achieved.

Observations on the feeding habits of adult Dynastids by caging young palms have been made, but the results were not altogether satisfactory. Both *Oryctes* and *Scapanes* caused the damage one would expect, but the *Xylotrupes* adults failed to feed satisfactorily and a further series of tests will have to be carried out later. It was not possible to get sufficient stocks of *Oryctoderus coronatus* to either check its feeding habits thoroughly or to further investigate its predatory habits; nor was it possible to test the feeding habits of *Papuana* spp.

Confirmatory life-history observations have been, or are being, carried out with the main species of Dynastids. Except for the egg stage of *O. rhinoceros*, there is little indication of any marked variation from the results obtained from other workers; The incubation period seems to show a greater variation in time than normally accepted. From time to time, observations have been made on the Scoliid parasites of local Scarabaeid larvae. So far the only abundant species associated with a host has been *Scolia pulchripennis* from *Xylotrupes gideon*. This appears to be a new record.

During August last year, a good colony of the Histerid, *Pachylister chinensis* was obtained from the Government Entomologist, Fiji. Two liberations each of 200 adults were made at Kurukukaul and Keravat. This beetle, while primarily a predator on Dipterous larvae, will readily attack first and early second instar larvae of the Rhinoceros Beetle if it comes in contact with them. While this species is not expected to have any pronounced effect on the host, it will certainly do no harm and may possibly be a useful general predator, especially on stock stations to which it will be distributed when available. If the Rhinoceros Beetle is to be controlled by biological means eventually, it appears likely that instead of one single predator or parasite being fully effective, reliance will have to be placed on a series of parasites and/or predators supplementing one another's activities. However, the Histerid is a slow breeder and shows no signs of establishment ver-

(c) *Sexava* spp.—

The Coconut Grasshoppers, *Sexava nubila* and *S. novaeguineae*, continue to cause extensive seasonal damage in various parts of the Bismarck Archipelago and the Admiralty Islands. Many plantations on Manus are affected, as are also numerous plantations on the middle east and west coast of New Ireland.

On New Britain the damage has been both slight in extent and limited in duration, while the Mainland plantations continue their record for freedom from damage of economic significance.

There has been no recurrence of *Sexava* damage on this station since shortly after the release of egg parasites in 1948. At that time, two species were liberated, *Leefmansia bicolor* and *Doirania leefmansi*, the original stocks of which were obtained from Taskul, New Hanover. *D. leefmansi* failed to become established although, prior to the war, it was considered to be the more effective of the two, at least on New Hanover. *L. bicolor* quickly established itself and periodic examination of *Sexava* eggs collected in the Oil Palm Block show that it has remained active and will account for as many as seventy per cent. of the host's eggs.

The pre-war prejudice against *L. bicolor* was that it was ineffective in event of an outbreak of *Sexava* and that, although it was easy to establish, it appeared to be unable to maintain itself for more than a limited period unless aided by additional liberations. Experience at Keravat since the war has been contrary to this, and the parasite is still active and effective after a lapse of five years.

Some observational work has been carried out on *L. bicolor* during the past few months, and work is in progress to build up stocks of the parasite for distribution to infested areas where it has not previously been released. Parasitized eggs have been forwarded to the Kalili group of plantations in New Ireland where efforts are being made to augment the number of parasites by exposing unparasitized eggs to the emerging wasps. This breeds particularly easily in captivity and many thousands can be bred out with little trouble. Stocks of parasites are being maintained at Keravat, and additional distribution will be made from time to time. This work, however, is being hindered somewhat by the difficulty of obtaining adequate numbers of *Sexava* eggs at the present time.

With regard to the mainland adult and nymphal parasites of *Sexava*, it has not been possible to do much work with these to date. Examination of some dozens of *Sexava* from Inrim Plantation, Manus, failed to reveal any internal parasites. Eggs from the same area will be examined shortly. It has not been possible to obtain any grasshoppers from Madang owing to their scarcity, although a small sample from Native groves at Maprik contained one specimen of the Strepsipteron, *Stichotrema dellatorreanum*. Larger stocks of both living and preserved specimens are expected shortly and, based on the findings, it is intended to make an attempt to establish both the Strepsipteron and the Tachinid in the chronic *Sexava* areas.

A recent report from the Kalili group of plantations indicates that the infestation is now on the wane, only the older fronds being stripped. Infestation is said to be worst at present on Karu Plantation on the east coast. There is no evidence of significant damage at Tabar or Lihir Islands.

Work on the chemical control of *Sexava* during the period was of a preliminary nature, and confined to soil treatment against the emerging nymphs and treatment of the base of the trunk to control the ascending nymphs. In the first treatment, the soil was experimentally dusted with insecticides at the rate of sixty pounds per acre, using two and a-half per cent. concentrations of Gammexane, D.D.T. and Chlordane. Results were largely vitiated by the difficulty in procuring an adequate number of eggs, and also by their poor emergence, even in the controls. Gammexane appeared to be completely effective, but no attempt was made to test its persistence. Treatment of the trunk of the palm and surrounding soil for a distance of some three feet with Gammexane was carried out at Kalili early in October. Both dust and an oil emulsion were used. Despite the fact that the succeeding interval between application and recounting some two months later was one of almost continuous rain, a reduction in hopper population of the order of eighty per cent. for the spray and sixty per cent. for the dust was obtained, while counts on nearby untreated palms showed a negligible decrease in population. While only of a preliminary nature, the indications are that further work along these lines is warranted when suitable trained staff is available.

Further references have been made to the control of *Sexava* by means of aerial spraying. However, nothing tangible eventuated during the past year. I am of the opinion that this method of spraying is quite unsuited to Territory conditions at the present time, and is likely to be so for many years to come. Of the plantations which would warrant a trial treatment, Pak appears to be the most suitable by far. The main drawbacks to aerial control are cost, inaccessibility to airstrips of the worst-affected plantations, and the relatively limited amount of spraying or dusting that would have to be done. It appears most unlikely that the larger aircraft companies would consider the operation feasible, while it is highly improbable that D.C.A. would permit a small aircraft like a Tiger Moth to fly to Manus to treat Pak Plantation except under conditions which would render the project untenable. The only possible economic use for aerial spraying in the Territory that I can see at present is for treating large areas of Kenaf, or similar annual crops, when they become established, since they are likely to develop pest problems of considerable magnitude in due course.

(*d*) *Giant Snail.*—

There have been no reports of further spread of the Giant Snail during the past year. Affected areas are still the Gazelle Peninsula, northern portion of New Ireland, Hansa Bay on the mainland, Duke of York Islands with two small centres at Kalili Village on the mid-west coast of New Ireland, and at Ulamona in the Talasea District.

It would appear that the initial high reproduction impetus of the snail has now passed, and that it has reached some degree of balance with its environment. Spread from the affected areas in some cases appears to be virtually at a standstill, compared with the quite rapid rate of advance that it was able to make even three years ago. Very large specimens, i.e. with a shell length greater than 100 millimetres, are noticeably absent now, while the general size reached in the field indicates that the normal life span now being attained is approximately two years. This is a similar condition to that obtaining in the snail's natural habitat and in Mauritius, where it has been established for more than a century.

Reports of severe damage by the snail are now singularly few. However, it is still a severe pest on a horticultural basis. Leguminous crops on this Station planted from seed suffer a consistent reduction due to its feeding. Bark-feeding on young Cacao is now slight, although leaf-feeding is quite marked on trees up to several years old. Some damage is being done to Citrus from both bark- and leaf-feeding.

Attempts to make observations on the snail at Mauritius and Kenya while collecting Scoliids were vitiated by the low temperatures in the first place and by a severe drought in the second. Limited observations were made on the Kenya coast south of Mombasa, but it was not possible to collect any predators owing to the unfavourable season. It is anticipated that colonies of the predacious Carabid, *Tefflus hacquardii*, and the predatory snail, *Gonaxis kibweiziensis*, will be received here during June or July. These will be bred up in the insectary before liberating them, in the first place, on the Duke of York Islands.

(2) MINOR PESTS.

(*a*) *Pests of Coconuts.*—

Pests of Coconuts, other than *Sexava* and *Oryctes*, have only caused spasmodic and isolated trouble during the past year. Instances of occurrence or outbreaks of a limited extent are mentioned in narrative form below.

The Coconut Leafminer, *Promecotheca papuana*, has been reported during the past year as causing localized damage at two points on New Britain. The first was an unspecified Native grove on the south coast towards Gasmata and the second was at Linga Linga Plantation, west of Talasea. In the latter outbreak, an area of 50 hectares has been largely eaten off. It is assumed that this is due to some upset in the parasite sequence and that it will recover, when the major part of the wet season has passed, by an influx of parasites from adjoining areas, or by a local build-up in population. A similar outbreak occurred in the same site some five years ago, but eventually recovered and in each area the attack has been confined to the cleared area of the plantation only. There is no indication of *Promecotheca* at Lindenhaven except for a small area at the rear of the plantation, which is persistent. Closer to Rabaul, specimens can always be taken, and unimportant damage seen, at various plantations along the North Coast Road from Rabaul.

The Coconut Histerid *Brontispa longissima*, is in frequent evidence in young palms throughout the Gazelle Peninsula, but although it causes a good deal of leaf-burning, it is not considered to be of more than limited importance at present. It appears to be more in evidence in isolated, self-sown palms than on plantations where large numbers of palms have been replanted. Possibly this is due to the inaccessibility of the former to the principal parasite of the beetle, *Tetrastichodes brontispae*. The Coconut Scale, *Aspidiotus destructor*, was also noticed on a number of young palms, mostly replants, but it is evidently effectively controlled by one or more indigenous parasites. The Coconut Hesperid, *Felicota* (*bambusae*) completely defoliated some isolated self-sown palms near Keravat, while the two Short Horned Grasshoppers, *Valanga* sp. and *Austracris* sp., are still causing much frond damage to the remains of the young coconut block on the Station.

Limited outbreaks of two incidental coconut pests occurred in well separated parts of the Territory. The Flower Bug, *Axiagastus campbelli*, was reported as swarming in very large numbers on spathes at Tanga Island and causing almost complete nutfall from several hundreds of palms. Occasional specimens have been found locally but appear to have been of no significance. Some specimens of the Coconut Nettle Caterpillar, *Parasa lepida*, were forwarded from Papua where it is said to be causing serious frond damage to some twenty acres of palms. There appears to be no previous record of this insect from the Territory.

Of Lepidopterous spathe pests, the Greater Spike Moth, *Tiranthaba rufivena*, has been the cause of a degree of nutfall in various New Ireland plantations, and also in the Bainings area. Efforts to obtain stocks of the parasite, *Apantales tirathabae* from Fiji have so far been unsuccessful. The Smaller Spike Moth, *Agonoxena pyrogramma*, has been recorded a number of times in the vicinity of the Station, but appears to be kept well under control by indigenous parasites, mainly a Braconid, *Apanteles* sp.

Of other Coleopterous pests, there was little active evidence during the past year. The Palm Weevils, *Rhyncophorus* spp., have been widespread but on very few occasions have they been the cause of death of palms. They are, however, reported to be somewhat more abundant on the older plantations along the east coast of New Ireland in the vicinity of Kavieng. The Base Borer, *Sparganobasis subscruciata*, was not found by Mr. C. Barrett in his investigations at Madang or Wewak, so is of little current importance in these areas. The Black Stag Beetle (*Eurytrachelus* sp.) and the Brown Stag Beetle (*Metopodontus bison*) have been found over a wide area locally on both coconut spathes and the inflorescences of several bush trees, but it is extremely doubtful whether they are of significant importance. The Cetoniid, *Lomaptera batchiana*, and *Panglyphyra* spp., have also been taken from time to time.

(*b*) *Pests of Cacao.*—

Apart from the Cacao Capsid, and despite the long wet season, there have been very few outbreaks of Cacao pests in the past year. This refers principally to leaf- and bark-eating caterpillars and beetles.

Chronic pests like the Cacao Weevil and Longicorn Borers (*Pantorhytes plutus* and *Glenea aluensis*) continue at about the same level as in previous years. At Keravat, and throughout the Peninsula generally, the Weevil Borer is still of little account in post-war plantings. On the Station it is still present in considerable numbers on the old Cacao, so that its comparative scarcity on the adjoining blocks of young Cacao can safely be ascribed, not to the fact that it has been unable to reach them, but to the smooth bark of the young trees precluding deposition of eggs in crevices, etc., where the emerging larva can be assured of effecting entry and the eggs are safe from ants. The Glenea Borer, on the other hand, is quite evident in Cacao of all ages. In the younger trees, the main area of attack is at the point of ramification, practically all the cases of collapse of two to five year old trees being a joint effect of borer tunnelling and high winds or heavy rains.

Of the potentially serious bark-eating pests, the Xyloryctid Moth, *Pansepta teleturga*, appears still to be confined to the coastal strip from Raulavat to Kabeira Plantations. In the inadequately shaded parts of these plantations it is causing a high percentage of branch dieback. The inability of this moth to spread throughout the Cacao areas of the Peninsula is puzzling, but it must be borne in mind as a likely serious pest in the future.

Leaf- and Pod-eating Lepidopterous larvae recorded from Cacao during the period were : *Prodenia litura, Ectropis bhurmitra, Heliothis armigera, Scapelode* sp., *Laspeyresia* sp., *Lithosia* sp., *Euproctis* sp., *Cacoecia* sp., nr. *encausta*, etc. Bark- and leaf-eating beetles recorded comprised several species of *Rhyparida*, including *R. impuncticollis, R. impressipennis* as well as two other species of the genus which could not be determined specifically. The Galerucid, *Monolepta semiviolacea*, caused considerable leaf-perforation at various plantations while the three weevils, *Exopthalmila glauca, Platyachus ruralis* and *Paratactus* sp., were widely distributed, but caused little damage. Of the larger leaf-beetles, the Cetoniid, *Glycyphana* sp. and the Rutelid, *Anomala aenotincta*, caused minor damage to new growth. Heteroptera were of limited occurrence during the period, only the Pentatomid, *Austromalaya* sp. and the Coreid, *Priocnemocoris flaviceps* having been recorded in numbers. Of the numerous species of Homoptera which attacked Cacao flush, the Jassid, *Selenocephalus* sp., was the only new record. The two tropicopolitan thrips, *Selenothrips rubrocincutus* and *Heliothrips harmorrhoidalis*, caused slight etching to young foliage and pods but were never severe. The Aphid, *Toxoptera aurantii*, was common and widely distributed on young foliage, but appears to cause no damage of consequence. The Collembolon, *Selina celebensis*, which caused much leaf-fall on young trees at Keravat several years ago, now causes little damage to the larger trees and has not been common in the rooted cuttings that have been planted out. The latter are damaged most by the Giant Snail and a small Geometrid larva which has not yet been identified.

(*c*) *Pests of Fibre Crops.*—

Apart from breeding out and identification, there has been no opportunity for working on the numerous insect pests which attack fibre crops.

It is evident that a large range of insects will attack Kenaf and these will probably be an important factor to contend with at a later date when, and if, a large area is put under this crop.

Apart from specimens taken at Keravat, material has been determined from Epo, Laloki and Bainyik. There is a close similarity in the species attacking Kenaf in all centres. While some species are awaiting identification, the following represent the commoner ones taken during the past year :—

(1) Lepidoptera	Tortricidae	*Cacoecia encausta*
	Noctuidae	*Prodenia litura*
	Geometridae	*Hyposidra talacea*
	Noctuidae	*Xonthodes transversa*
	Pyralidae	*Sylepta derogata*
(2) Homoptera	Ricaniidae	*Ricania* sp.
	Ricaniidae	*Euricaria splendens*
	Flatidae	*Colgor* sp.
		Armacia sp.
(3) Orthoptera	Acridiidae	*Atractomorpha psittacina*
Coleoptera	Eumolpidae	*Rhyparida coriacea*
		Rhyparida impressipennis
		Rhyparida spp.
	Cetoniidae	*Glycyphana* sp. nr. *mollendorfi*
	Galeruchidae	*Monolepta semiviolocea*
		Microlepta sp.
		Podagrica obliterata.

Virtually the same range of species has been reared from Cotton at Keravat with the addition of the Rough Bollworm, *Earias fabia,* and the stainers, *Dysdercus* spp., although one species of the latter is said to have caused some infertility in seed at Laloki.

At Keravat, Manila Hemp is rather free from insect attack and only a few species have been reared from it. These include the N.G. Rhinoceros Beetle, *Scapanes grossepunctatus,* which often tunnels extensively in the pseudostem. The Tineid Moth, *Trachycentra chlorogramma,* also breeds in a similar location but cannot be classed as serious. The Banana Scab Moth, *Nacoleia octasema,* etches the fruit but would be unimportant on Hemp grown commercially. The Banana Aphis, *Pentalonia nigronervosa,* is widespread and common, but it is only important as a victor of Bunchy Top virus. The Ramee Leafroller is the only other fibre pest noted. Its habits are similar to the Cotton Leafroller, *Sylepta derogata,* but it is a distinct species, *S. sabinusalis.* It is very common but does not appear to be serious.

(3) MISCELLANEOUS.

(*a*) *Biological Control.*—

During the past few months a limited amount of work has been carried out as opportunity offered on several biological control projects at the request of Agricultural Departments overseas. This has necessarily been on a limited scale, but an attempt has been made to carry out the requests as it is hoped to obtain additional living material in exchange, notably further stocks of the Rhinoceros Beetle Scoliids from Mauritius and Zanzibar.

The Zanzibar request concerned material of the Green Tree Ant, *Oecophylla smaragdina,* with a view to attempting to establish our species there to help combat the Coreid, *Theraptus* sp., which is causing premature nutfall on a scale similar to that caused by *Amblypelta* in parts of the Solomons. Several shipments of queens have been made but the N.G. species does not appear to be able to readily adapt itself to the Zanzibar species of Homoptera although they arrived in good condition.

Inquiries from Mauritius concern the species of Lepidopterous larvae attacking Sugar-cane locally. Two species have been reared from both wild and cultivated canes near the Station, one being the Noctuid, *Sesamia grisescens* and the other a Crambid, *Chilotraea terrenellus*. The latter does not appear to occur in the Highlands but can cause severe damage on the Gazelle Peninsula and, presumably, in the New Guinea Lowlands. It appears to be a new record as a pest of Sugar-cane, although a number of other species of this and related genera are pests of Sugar-cane and Rice in South East Asia, etc. From the two borers, five species of parasites have been reared.

During November and December, 1952, the Government Entomologist, Fiji, visited Keravat in search of parasites of the Banana Scab Moth, particularly a Tachinid parasite, *Bactromyia frasseni*. This was a poor season for collecting and his visit was unsuccessful. A check is being kept of the seasonal parasitism of this pest and shipments will be despatched later in the year when the fly becomes relatively abundant. The Fiji Government is also anxious to obtain some of the local parasites of the Smaller Coconut Moth (*Agonoxena phrogramma*) but so far this year this species has been noticeable only by its scarcity.

(*b*) *Collection and Determination of Specimens, etc.*—

Other than insects attacking plants of some economic importance, little attempt has been made to increase the insect collection.

Approximately 150 species associated with crops of varying importance have been determined from specific plants by observation or breeding out during the past year, most of which have been determined by the Commonwealth Institute of Entomology which, in every instance, has been most helpful. A further hundred or so different species are in transit at present. Considerable assistance where possible has been given by the Division of Entomology, C.S.I.R.O., in the form of loans of scientific articles, determinations of specimens, microfilming, etc.

Small general collections have been made in various places by Messrs. Charles Barrett and J. H. Barrett. The places they visited included New Ireland, Taba, Lihir, Manus, Madang, etc.

A number of specimens of economic crops have been received from Departmental Stations from time to time.

Where possible, specimens of limited groups have been collected for, and despatched to, a number of overseas workers and institutes. Some hundreds of specimens have been sent away in this manner and it is surprising to realize how little known the Territory is from an entomological aspect.