

## ORTHOPTERA IN SUSSEX

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This paper follows my earlier report in this journal (Haes, 1973) covering the distribution of native Saltatoria (Orthoptera) in Sussex up to 1970.

During 1972-74, particularly in the warm summer of 1973, I was able to investigate a great many new tetrads (2 x 2 kilometre squares) and despite setbacks in the cool, wet and stormy summer of 1974, have now been able to visit virtually all potentially worthwhile Sussex sites. A final report on the tetrad-mapped distributions of Orthoptera in the county is now presented. The extent of the survey may be judged by reference to the maps of *Chorthippus parallelus* (Zetterstedt) and *C. brunneus* (Thunberg), but I must stress that in many cases only a small portion of a particular tetrad was visited. However, all investigations were carried out on the more visually promising areas for Orthoptera, so that it seems reasonable to assume that the maps give a fair idea of the present (October, 1974) distributions of these insects in Sussex.

It may be of interest to note that tetrad surveys of butterflies, Odonata, aculeate Hymenoptera and spiders in Sussex have been started, or will begin shortly. Offers of help from any readers with mapping these groups in the county will be gratefully received. The main object of such surveys is to supply the Sussex Trust for Nature Conservation with data which should help it to present strong cases for the protection of any sites of rare interesting insects and related orders especially if threatened with destruction.

It is also pleasing to be able to record that similar surveys of Orthoptera are now being undertaken by Mr. E. Philp in Kent; Mr. D. Baldock in Surrey; Mr. A. J. Brown, Mr. G. R. Else and Mr. C. A. Searle in Hampshire and Dorset; Mr. A. Kennard in Devon and Cornwall, and Mr. M. J. Skelton in East Anglia.

In Sussex the survey has revealed the existence of no new species beyond those listed in my 1973 report. However, it is now possible for me to give rather fuller details about the apparent habitat requirements of the species recorded than was the case in my earlier paper. I have also added some notes from my own observations on behaviour in the field of some of the more interesting species, as I feel that such details may be of help to anyone wishing to begin a study of these engaging insects.

## APPARENT CHANGES IN DISTRIBUTION SINCE 1970

A number of colonies of rare or local species appear to have been destroyed by building, by unchecked scrub growth, by

- HAES, E. C. M., 1974. Late Records of Native Orthoptera. *Entomologist's Gaz.*, **25**:200-202.
- HARTLEY, J. C. & WARNE, A. C., 1972. The developmental biology of the egg stage of Western European Tettigoniidae (Orthoptera). *J. Zool. Lond.*, **168**:267-298, 1 fig.
- KNOWLTON, D., 1973. *The Naturalist in Central Southern England*. 240 pp., 20 figs., 34 pls. Newton Abbot.
- LUCAS, W. J., 1920. *A monograph of the British Orthoptera*. xii + 264 pp., 25 figs., 25 pls. London.
- MENZIES, I. S., 1946. *Conocephalus fuscus* F. (Orth. Tettigoniidae) in Sussex. *Entomologist's mon. mag.*, **82**:39.
- PAYNE, R. M., 1955. *Decticus verrucivorus* (L.) (Orth., Tettigoniidae) in Sussex. *Entomologist's mon. mag.*, **91**:263.
- RAGGE, D. R., 1965. *Grasshoppers, Crickets and Cockroaches of the British Isles*. xii + 299 pp., 130 figs., 22 pls. London & New York.
- RAGGE, D. R., 1973. The British Orthoptera: a Supplement. *Entomologist's Gaz.*, **24**:227-245.

ploughing of old pasture or by very heavy grazing since 1971. These losses or apparent losses are represented by open circles on the maps.

On the credit side two new Sussex localities for each of *Conocephalus discolor* (Thunberg) and *Decticus verrucivorus* (Linnaeus) have been confirmed since my previous paper was written, while the main Sussex population of the latter species now lies within the boundaries of a National Nature Reserve. Many further colonies of *Omocestus rufipes* (Zetterstedt) and *Tetrix subulata* (Linnaeus) have been recorded in East Sussex, where a specimen of *Gryllotalpa gryllotalpa* (Linnaeus) was seen near a house in Uckfield in 1964. However, no existing colony of this species has been discovered in the county since this survey began in 1965. I should very much like to hear from any reader who can provide data about the insect in Sussex from any period in the past.

#### REFERENCE TO SPECIMENS IN THE GUERMONPREZ COLLECTION

In his 1920 Monograph Mr. W. J. Lucas only mentions a selection of the voucher specimens Mr. H. L. F. Guermonprez placed in his collection between 1872 and 1912. This collection is now in Portsmouth Museum. As the collector himself published virtually nothing on these Orthoptera and as they represent the results of the only known comprehensive Orthoptera survey in the county before 1965 it seems appropriate that they should be covered in this paper, especially as they provide some interesting comparisons with present day distributions.

#### THE DISTRIBUTION MAPS

The tetrad (2×2 kilometre square) unit maps of Sussex used for this paper were prepared by Dr. J. C. Dony for use by the Sussex Flora Society. These maps do not take into account the very recent vice-county and county boundary changes, but this is of little consequence, since, for ease of comparison with earlier records, the original Watsonian vice-county boundaries are still considered significant for all records of plants and animals.

Key. Solid dots represent species present into 1974; open circles species present in 1965-70 but apparently lost from the tetrad by 1972-74. Crosses represent pre-1965 records not refound during the present survey. Only pre-1965 records for which an exact locality is known are given on the maps.

#### SPECIES RECORDED (1965-1974)

##### TETTIGONIIDAE (Bush-Crickets)

###### Meconematinae

##### *Meconema thalassinum* (Degeer) (Oak Bush-Cricket)

Widespread throughout the county, perhaps commonest over sandy soils but present in chalk or clay areas as well. It occurs most numerous on oaks but may be present in numbers on most

broad leaved trees such as elms, poplars, sycamore or limes as well as in tall elder scrub or old unkempt mixed hedgerows. During the day it is usually to be seen flat against the underside of a leaf. Females may often be seen on furrowed tree trunks in autumn egg laying, and as the insect is nocturnal and flies readily, it may frequently be found on ceilings or around street lamps in areas where there are plenty of broad-leaved trees. In 1973 the oak bush-cricket was found in small numbers in reed beds and adjacent sallow scrub by Pagham Lagoon in similar habitat to that noted by Guermonprez in approximately the same area in 1897. Because of the rapid spread of Dutch elm disease in *Ulmus procera* Salisbury, the field elm, it seems likely that the insect will soon become scarce in the coastal plain south of the Downs, where the tree provides its main habitat.

Guermonprez's records include specimens from Singleton Round Wood 1894; Slindon 1899; Harting 1909; Pagham Marsh 1897; Dell Quay 1907 and Uckfield 1909. All specimens are labelled *Meconema varium* Fab.

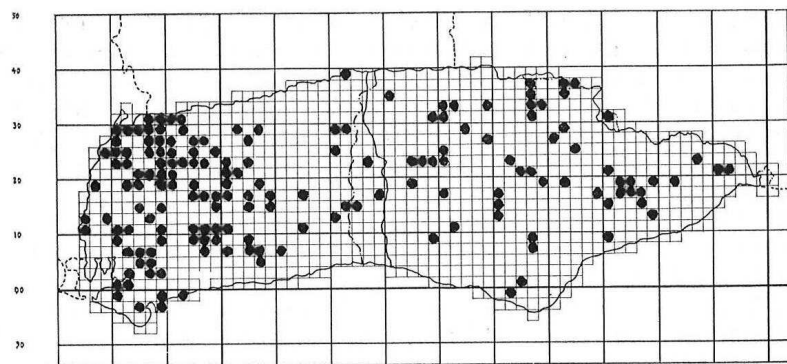
For recent tetrad distribution see fig. 1.

##### Tettigoniinae

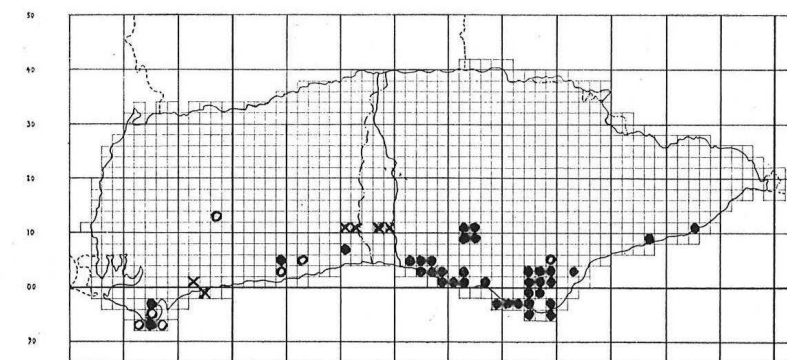
##### *Tettigonia viridissima* Linnaeus (Great Green Bush-Cricket)

Only a few fragmented colonies of this fine insect are now left in West Sussex. Until 1973 its main stronghold in the vice-county was in the Selsey peninsula, where there were several good colonies between the town itself and Sidlesham. In the last year, however, the clearance of rough pastures and old hedges and the development of several long-neglected building plots has reduced this population to a few precarious pockets which may be insufficient for the long-term survival of the insect in the area. However, from observations elsewhere, really small colonies do seem able to persist as long as some favoured rough headland or hedgerow is allowed to remain. Such a colony may still be seen, or rather heard, on the southern edge of Highdown, near Worthing.

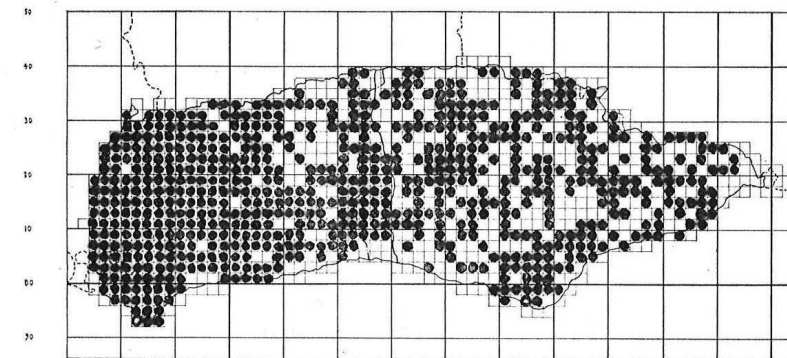
In West Sussex the bush-cricket was mainly distributed on the now much urbanised or arably farmed coastal plain. In East Sussex the insect is still locally common and widespread and is mainly a downland species with colonies far less vulnerable to such development. A good colony by the A27 at Polegate was destroyed by building in 1974, otherwise the main colonies remain undisturbed, although far fewer individuals could be found in the very cold wet summer this year than in 1973. At the present time the species occurs from the eastern suburbs of Brighton, via Whitehawk Race Course, Sheepcote Valley and Rottingdean, through Newhaven, Seaford Head, the Seven Sisters Country Park (very sparse) to Eastbourne, along the coast. On the Downs inland it occurs around Malling Hill and Southerham Lime Works east of Lewes, and from Windover Hill through Jevington to



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Fig. 1 *Meconema thalassinum* (Degeer)Fig. 2. *Tettigonia viridissima* LinnaeusFig. 3. *Pholidoptera griseoptera* (Degeer)

Ratton Village. Eastwards there are still small colonies near Pevensey, between Bexhill and Hastings and near Fairlight, where occasional individuals have been located since 1965. Guernonprez records: Selsey 1906; Bersted 1902; Felpham 1891, probably where a holiday camp now stands. All specimens are labelled *Phasgonura viridissima* (L.)

For recent distribution see fig. 2.

#### Dectinae

#### *Decticus verrucivorus* (Linnaeus) (Wart-Biter)

The largest known colonies in England are on downland in East Sussex, where several specimens were located even in the cold weather of August 1974. In the previous August over one hundred males were heard stridulating in the best locality, now part of a National Nature Reserve. Unfortunately in a smaller colony about two kilometres away, where the species was first recorded in Sussex, by Mr. R. M. Payne in 1955, the coarse, rough turf, of *Brachypodium pinnatum* (Linnaeus) and other strong growing grasses, has been extensively disrupted over the last four years by deliberate burning followed by heavy cattle grazing. The species seems now to be virtually extinct here. However, despite its size the wart-biter is a very elusive insect, often difficult to locate, for it is very efficiently camouflaged, and a disturbed individual may cover several metres in powerful but low level leaps before it has been glimpsed. In addition the distinctive clicking stridulation of the male is only produced in hot, though not necessarily very sunny weather, and even then may be "drowned" by the sound of wind in coarse dry grass and the incessant chorus of acridids, which are invariably abundant in the vicinity of its colonies. For these reasons smaller colonies of wart-biters may remain undetected. Like the previous species, colonies producing only a few adults each year, even each alternative year (since its eggs are now known to take at least two seasons to hatch) may be able to persist.

Two such small colonies certainly exist in Sussex at the present time, well away from the main centre of distribution. One is on downland, but the other is in a young conifer plantation on the site of rough pasture land that dates back at least to Jacobean times. This interesting colony was discovered accidentally by a lepidopterist, Mr. R. M. Craske on 30. ix. 1969 (pers. comm.) when a female specimen jumped from the undergrowth onto the minor road by which he had parked his car for lunch. In fact this is the only specimen that has so far knowingly been seen in the area. However, males have occasionally been heard stridulating since (including one by the writer in 1973). The ground vegetation here is so dense that a further sighting, let alone capture of a specimen would need luck as well as experience. As a result of Mr. Craske's representations, the owner of the site has arranged

for parts of the plantation to be kept clear so that this bush-cricket, as well as the rich butterfly fauna, may continue to thrive.

*Decticus verrucivorus* is at least partly carnivorous: in August 1969 I observed a female wart-biter approach a resting female *Chorthippus parallelus*, semi-circle it slowly, leap upon it, and holding the struggling grasshopper with its fore limbs, eat its thorax and then the head and first few segments of the abdomen, leaving the legs, wing pads and greater portion of the abdomen. The entire process took about ten minutes. I have since observed the performance repeated by a captive male. I have also seen both sexes eat leaves of stinging nettle and *Centaurea nigra* Linnaeus (knapweed), in the wild state, on downland. This feeding was observed around mid-afternoon in hot sunshine. I have, however, observed pairing in quite cool, dull conditions in early evening, long after obvious activity had ceased. From my own observations of it in England since 1964, I should say that the species has an early and rather short season. Pairing seems to take place from about the last week of July until mid August. By the second week of September most males appear distinctly worn, although they may still stridulate freely, while females seem mainly to be swollen with eggs or emaciated and weak after laying. The insect becomes very scarce after the end of September. My own latest record is for an extremely worn but still stridulating male on 6.x.1971 at Lydden in Kent.

There were no Guermonprez records. Because of possible risk from irresponsible collectors I have not included a tetrad map for this species.

*Pholidoptera griseoptera* (Degeer) (Dark Bush-Cricket)

In several places, such as at Paghams, this common insect has recently been much reduced in numbers by building, the clearance of hedgerows and the filling-in and piping of once open drainage ditches. However, the dark bush-cricket is still by far the most numerous bush-cricket in Sussex, with at least one recorded colony in over three-quarters of the tetrads examined. In most years the distinctive "chipping" of the males may be heard well into November, but during the cold wet autumn of 1974 there were few to be heard after mid October even in places where the species is normally abundant. Any consequences of this comparatively early demise in populations is not, however, likely to become apparent until 1976 as this, like most of the other native Dectinae, is now known not to hatch from its eggs until at least the second year after laying. In the wild state I have observed this bush-cricket to feed on small caterpillars, a lacewing larva (*Chrysopa* sp.), a disabled wolf spider (*Lycosa* sp.) the young shoots and leaves of bramble (*Rubus* sp.), stinging nettle, honeysuckle, *Heracleum sphondylium* Linnaeus (hogweed), unripe seeds of *Pastinaca sativa* Linnaeus, *Viola odorata* Linnaeus (sweet violet) and ripe blackberry fruits.

Near Henfield, in a place where the species is exceptionally numerous, there is a considerable proportion of strongly purple-tinted individuals in most seasons. This unusual colouring is especially pronounced in female imagines.

Guermonprez records: South Harting 1898; Bow Hill 1894; Graffham 1911; Eartham 1894; Slindon 1894; South Bersted 1898; Walberton 1897; Felpham 1901; Chiltington (many specimens) 1912. All specimens are labelled *Thamnotrizon cinereus* Finot.

For recent distribution see fig. 3.

*Platycleis albopunctata falcata* (Zetterstedt) (Grey Bush-Cricket) (Synonym *P. denticulata* (Panzer))

Only one locality for the species in Sussex has been added (Pilesey Island) since my original paper. All colonies are strictly coastal and nowhere is the species to be found in Sussex more than a kilometre from the sea, although just over the Kentish border, in the Dungeness area, the bush-cricket occurs as far inland as Lydd, perhaps the most inland locality for the insect in Britain. At Southwick the now completely isolated but strong colony by the Esso oil storage tanks usually produces a proportion of imagines with the top of the head and pronotum of a dull crimson colour; presumably similar to those Devon specimens referred to by W. J. Lucas in his Monograph.

In the wild I have seen this species feeding on leaves of hogweed, honeysuckle, stinging nettles and bramble. In hot weather the grey bush-cricket flies readily. Surprisingly Guermonprez has no Sussex specimens in his collection, unless the small nymph from "Cliffs at Hastings", supposedly the next species, is in fact of this species. (I did not feel experienced enough to lift the obviously very fragile little relic from its board to examine it minutely.)

For recent distribution see fig. 4.

*Metrioptera brachyptera* (Linnaeus) (Bog Bush-Cricket)

It is interesting that this insect, with such a restricted heathland habitat, is often so abundant where it does occur. Even in the really bad summer of 1974 this species was plentiful on most Sussex heathlands, and in heathy woodland near the Surrey border in the vicinity of Haslemere. Only two new localities have been added since my original paper; Eridge Park, where the species was located by Mr. D. G. Chelmick in 1973 while searching for Odonata, and Court Lodge Down just south-east of Tunbridge Wells where it was located by Mr. W. R. Dolling (pers. comm.). In the wild I have several times observed this species feeding on unripe seed heads of *Juncus* spp. and leaves and seeds of the heathland grass *Molinia caerulea* (Linnaeus). The macropterous form has not yet been found in Sussex, although recorded as close as Thursley Heath in Surrey in 1970.

Guermonprez records: Chiltington (many specimens) 1912; "Cliffs near Hastings" nymphs abundant, vi 1885.

For recent distribution see fig. 5.

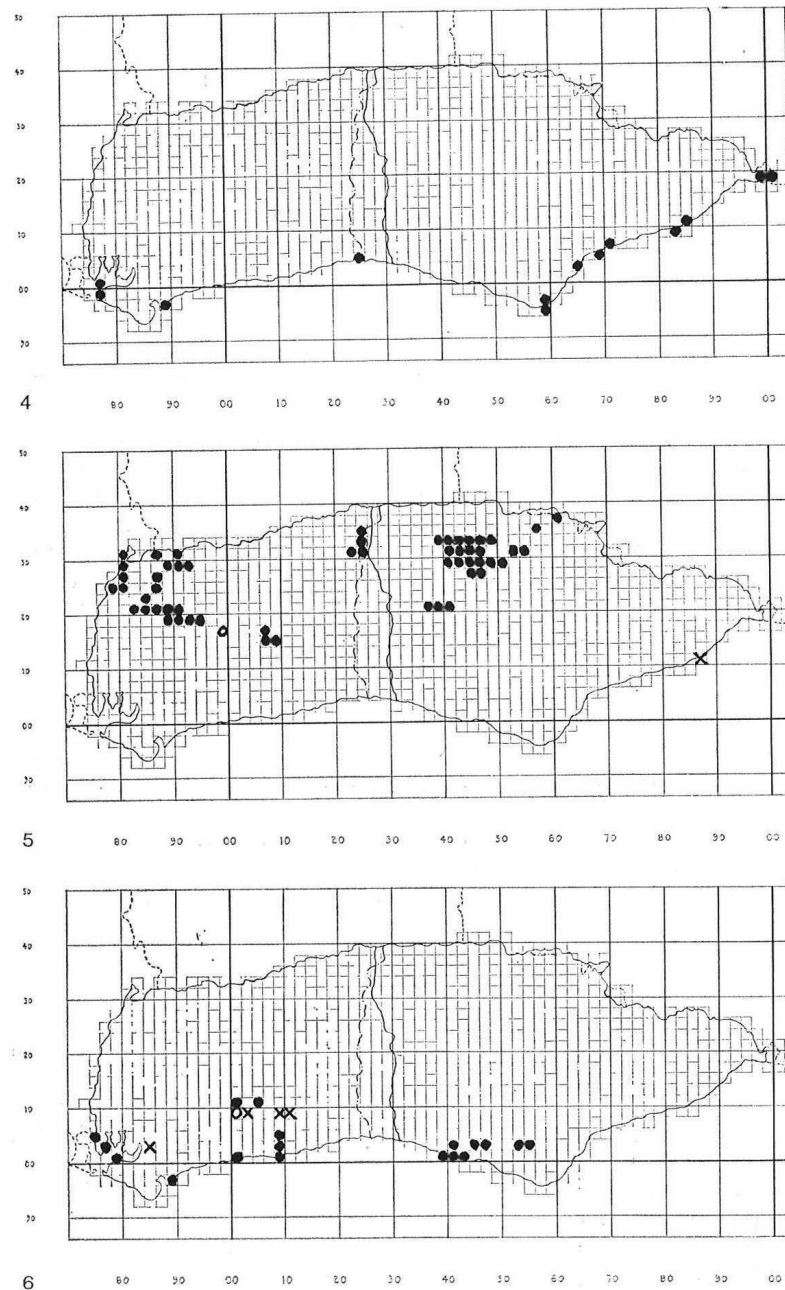


Fig. 4. *Platycleis albopunctata falcata* (Zetterstedt)

Fig. 5. *Metrioptera brachyptera* (Linnaeus)

Fig. 6. *Conocephalus discolor* (Thunberg)

### Conocephalinae (Cone-Heads)

Species of this subfamily appear to hatch from eggs in the season following laying, unlike most other native bush-crickets which hatch in the second year.

#### *Conocephalus discolor* (Thunberg) (Long-winged Cone-Head)

Since Dr. I. S. Menzies first discovered this cone-head in Sussex at Ferring in 1945, scattered colonies have been found from Thorney Island eastwards to the northern edge of Lullington Heath National Nature Reserve, as well as westwards to Portsmouth and Botley Wood in south-east Hampshire (G. R. Else, pers. comm.). From this it is clear that the insect was once widely distributed over most of the coastal plain and well into and even across the line of the South Downs. It seems strange therefore that it was not detected in the region until 1945. It is an inhabitant of coarse, rough grassland in hot, sheltered areas. Occasionally, as on Thorney Island, it is present in the *Agropyron pungens* Roemer & Schult (sea couchgrass) zone where it mingles with the short-winged cone-head, but normally it is a distinctly dry-grassland species and not a salt marsh insect. On chalk downland it occurs, often abundantly, in the coarse grass favoured by the wart-biter and in one place the two insects do occur together. In Sussex its most northerly stations are at Arundel Park and Amberley Mount.

The brown variety has now been seen in all ten known Sussex localities, while the exceptionally macropterous form has been found regularly (even in 1974) at Itchenor, Pagham, Telscombe Cliffs and Lullington. This extra-macropterous form flies very readily and in warm weather can cover over a metre in direct flight, whereas the normal form in this country, with hind wings which extend barely beyond the tip of the abdomen, seems far less inclined to fly.

For recent distribution see fig. 6.

#### *Conocephalus dorsalis* (Latreille) (Short-winged Cone-Head)

Two large inland colonies have recently been located. One is in coarse herbage by a stream tributary to the West Sussex Rother, the other, found by D. G. Chelmick while checking on the distribution of Odonata, is in similar sedgy vegetation by an isolated lake near Haywards Heath. In all other known localities in Sussex the cone-head is accompanied by its usual companion *Chorthippus albomarginatus* (Degeer), but here the latter appears to be absent, presumably because the waterside vegetation is too coarse to support that species, although *C. parallelus* was present in each case, as was the mud-dwelling *Tetrix subulata* (Linnaeus). Inland in Sussex *C. dorsalis* is a quite frequent reed bed and water meadow insect. On the coast, where it is almost invariably accompanied by *C. albomarginatus*, it occurs commonly in the

*Agropyron pungens* zone around salt marshes, or in rough herbage over shingle or sand dunes.

The macropterous f. *burri* Ebner has now been found on two occasions (1969 and 1973) by Pagham Harbour. This fully winged form flies readily in hot weather.

In the wild I have seen the short-winged cone-head feed on semiripe fruits of the rushes *Juncus effusus* Linnaeus and *J. gerardii* Loiselure and unripe fruits of *Triglochin maritima* Linnaeus (sea arrow-grass).

Guermonprez records: Pagham Marsh 1895, 1897 and 1908; Amberley Wild Brooks 1909. It is interesting that Guermonprez did not record *C. albomarginatus* at Amberley Wild Brooks in 1909 as the grasshopper is now very common in the locality.

For recent distribution see fig. 7.

#### Phaneropterinae

##### *Leptophyes punctatissima* (Bosc) (Speckled Bush-Cricket)

This widespread and familiar species is certainly more numerous in sandy areas than elsewhere, but even in the most suitable localities, as for example around Midhurst, it is unusual to find more than a pair of adults on a particular bush or clump of herbage. Small nymphs may certainly be seen grouped closely on such favoured plants as honeysuckle, *Teucrium scorodonia* Linnaeus (wood-sage) or bramble in May or June, but by maturity these will have dispersed. From observations on a small colony established in my own garden I would say that the adults are not so much aggressive as naturally repellent to each other, except when a male courts a receptive female. Adults seem to take up a permanent resting place on a bush. If a second imago of the same sex is deliberately placed nearby there will be a period of mutual examination with antennae and in a few minutes the "stranger" will move a metre or more away, where it may then take up a residential station. If males are placed together a quite intense period of (to our ears faint) clicking stridulation will ensue before the two separate, but I have never witnessed more challenging activity in this species, whereas in other native bush-crickets a period of fencing with hind legs and brief combat with the mandibles is quite usual.

I have observed the speckled bush-cricket to feed on wood sage, honeysuckle, bramble, stinging nettle, and in the garden on *Lippia citriodora* H.B.K. (lemon verbena).

Guermonprez records: Linch Down 1902; Cocking 1897; Slindon 1899, 1901, 1902, 1905; Hunston 1909; Felpham 1901; Bognor (garden) 1896.

For recent distribution see fig. 8.

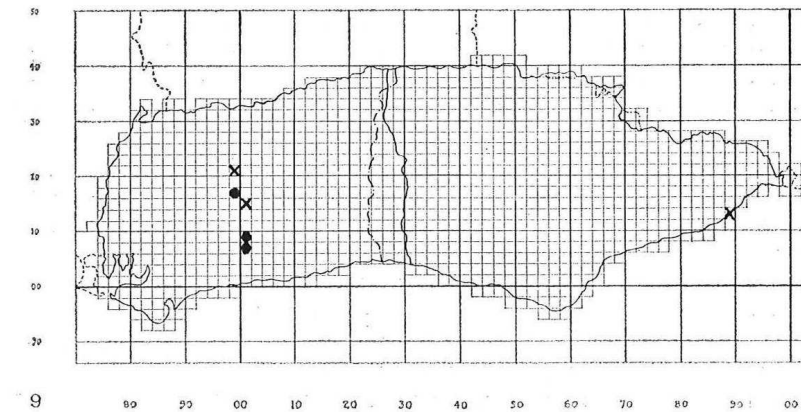
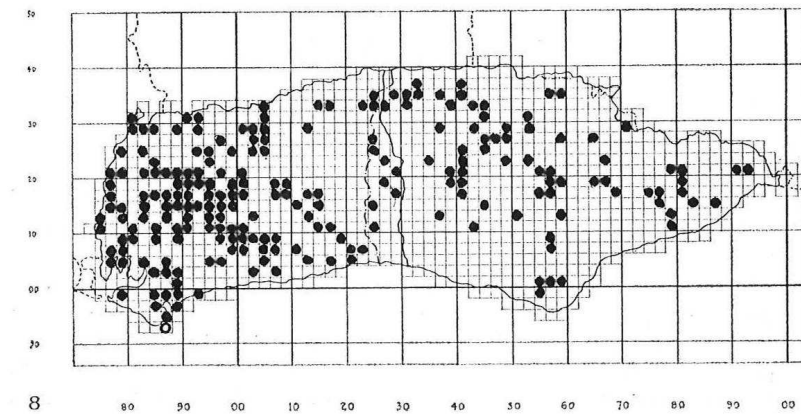
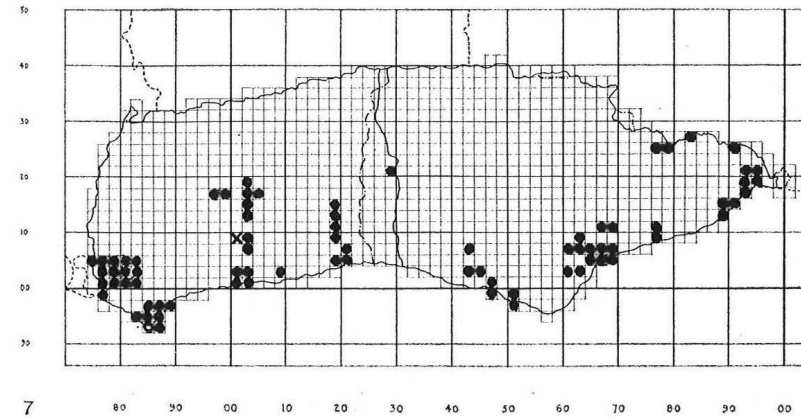


Fig. 7. *Conocephalus dorsalis* (Latreille)

Fig. 8. *Leptophyes punctatissima* (Bosc)

Fig. 9. *Gryllus campestris* Linnaeus

## GRYLLIDAE (Crickets)

## Gryllinae

*Gryllus campestris* (Linnaeus) (Field-Cricket)

The field-cricket continues to persist on sandy grassland in the Coates area and on grazed or mown chalk turf at Arundel. Unless the cricket does in fact still occur in the Isle of Wight (as has been recently suggested) these are now the only two places in Britain where the species occurs naturally, and part of the Arundel colony is the result of an apparently successful re-introduction (by the writer) in 1969. The other part of the Arundel colony and the major part of the Coates colony are on *strictly* private land. The owner of the site of the Coates colony continues to maintain the area so that part of the grounds remain as suitable short turf to allow the insect to persist. It may be of interest to note that an attempt has recently be made (1973) to establish the cricket on a Hampshire Trust Nature Reserve; and that the insect was last definitely seen in Surrey in the wild state on 30.v.1964 by Mr. P. F. le Brocq and the writer. A third Sussex locality at Watersfield seems to have been destroyed by building in the early 1950's. There was apparently a pre-1940 colony near Petworth (Miss L. Streeter, pers. comm.).

In observations made on marked burrows in the Arundel colony (1970-73) I found that about a third of the nymphs which had successfully overwintered in their burrows failed to reach maturity. Also from these observations it seemed that, assuming each female laid 100 fertile eggs in a season and assuming that all eggs produced a nymph, then about one in sixty survived to adulthood in a favourable season such as 1973. In a very simple experiment carried out in the same area and involving a few males marked with a dab of suitable white paint on the thorax, it was clear that at least some males dug new burrows some metres from their original ones, about a month after reaching maturity. It seems, from observation in the wild and with captive specimens, that a female which is ready to mate (about a week after the final ecdysis) pairs with a male at his burrow and then, when gravid, drives the still amorously inclined male away, often after inflicting considerable damage. In the wild state nymphs appear to take over four months to reach the tenth instar in which they are able to hibernate. In our climate therefore it seems likely that only the progeny of the first matings (in late May or early June) are likely to be in a condition to hibernate successfully. From checking the grazed areas near the burrows it appears that the crickets in the wild state feed almost exclusively on grasses such as *Festuca rubra* Linnaeus and *F. ovina* Linnaeus in chalky areas and *F. rubra*, *Agrostis tenuis* Sibthorpe and *Holcus mollis* Linnaeus in sandy soil.

Guermonprez records: Arundel Park 1909.

For recent distribution see fig. 9.

*Acheta domesticus* (Linnaeus) (House-Cricket)

Colonies of house-crickets are established in several parts of the county at the present time, but a colony of exceptional size in the West Sussex County Council's rubbish tip by Pagham Harbour at Keynor, Sidlesham (from at least 1965 until 1973 is now in the process of disintegration, as the site is being converted into an amenity area. Road development appears to have destroyed another large rubbish tip colony near Littlehampton, although the cricket still persists in the town itself. Perhaps the best area for the insect in Sussex now is in the Broadwater district of Worthing, where it is well established in a zone of light industrial buildings and rubbish tips to the east of the town.

Guermonprez records: Bognor (Bakeries) 1897 and 1909.

For recent distribution see fig. 10.

## GRYLLOTALPIDAE (Mole-Cricket)

*Gryllotalpa gryllotalpa* (Linnaeus) (Mole-Cricket)

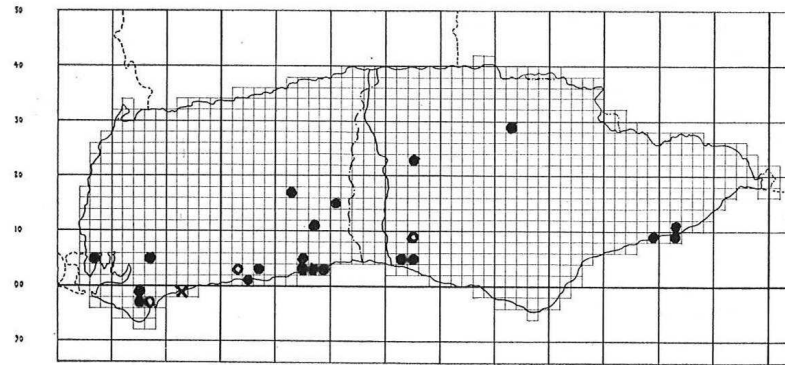
The sighting in 1964 of an undoubted mole-cricket in an Uckfield garden by Mrs. N. Hart raises hopes that the species may occur by the middle reaches of the Ouse. There are certainly good water meadows in the area, although the soil is predominantly clay over most of this part of the county. As the town is a market centre it is also possible that such a single specimen may have been a stray, perhaps brought in with a load of vegetables from southern Europe. Against this the insect is a very secretive species and the males do not seem to stridulate freely in this country, so that very restricted colonies might well persist undetected. Mole-crickets certainly survived in Surrey until the mid 1950's if not later, and are still apparently present in at least two places in south Hampshire. I feel hopeful that a colony may yet be discovered in Sussex. Actually the last records of definite colonies in the county were by Guermonprez himself. His collection contains a female from Fittleworth, 1909 and two unlabelled males. These his erstwhile colleague, Mr. E. H. Venables (pers. comm.) considers may have been taken at Swanbourne Lake in Arundel Park at about the same period. Single specimens have also been recorded from near Bexhill in 1939 and Chichester early in the century.

## TETRIGIDAE (Ground-Hoppers)

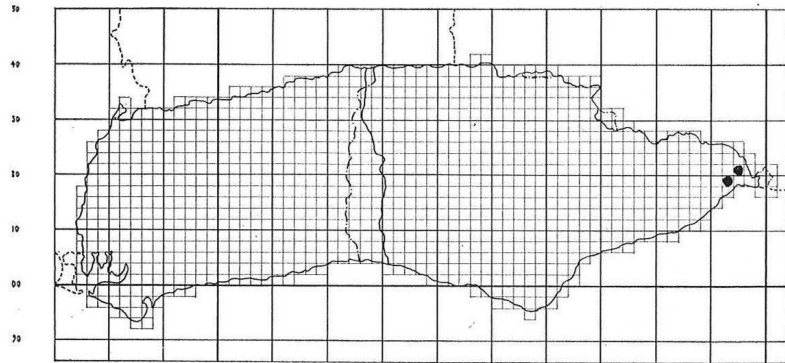
## Tetriginae

*Tetrix ceperoi* (Bolivár) (Cepero's Ground-Hopper)

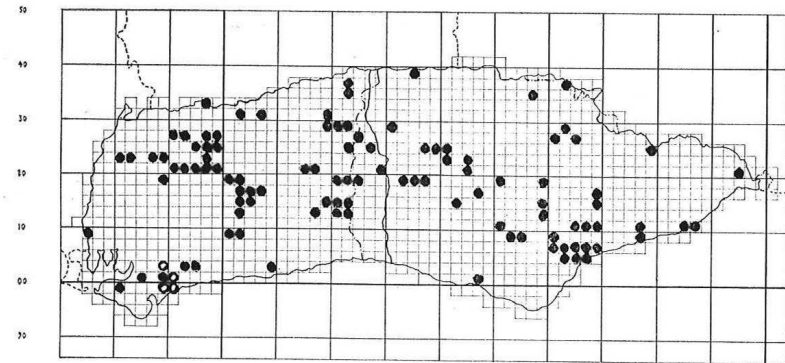
This species is still only known in Sussex from the Rye area, where it was first recorded by Mr. R. A. Farrow in 1962. There are two strong colonies in marshy localities, but one of them seems now to be threatened by gravel extraction. In the field this species may be tentatively identified by its comparatively small size



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Fig. 10 *Acheta domesticus* (Linnaeus)

Fig. 11 *Tetrix ceperoi* (Bolivár)

Fig. 12. *Tetrix subulata* (Linnaeus)

compared with the next species and by viewing it from above and noting that the eyes are relatively close together on a parallel-sided head and that the vertex between the eyes hardly projects beyond them. *Cepero's* ground-hopper also tends to be more distinctly patterned than the next species. However, for certain identification a voucher specimen of an adult should be sent to Dr. D. R. Ragge, Entomology Department of the British Museum (Natural History). This species was not recognised as British in Guermontprez's time.

For recent distribution see fig. 11.

*Tetrix subulata* (Linnaeus) (Slender Ground-Hopper)

A widespread and very locally common insect in Sussex on wet mud by streams, ponds and ditches, but not by brackish or salty water, where its two frequent companions, *Conocephalus dorsalis* and *Chorthippus albomarginatus* abound. When adult it is proportionally larger and slightly broader than *T. ceperoi*, and when viewed from above its eyes are set comparatively widely apart on the distinctly divergent sides of the head, while the vertex extends clearly beyond them. The form *bifasciata* Herbst is frequent in Sussex and this variety may be distinguished from the next species by the comparatively low ridge down the centre of the pronotum. This form appears to be as free-flying as the normal form. The species also swims readily and deliberately, even below the surface of shallow ponds or streams. I have watched specimens jump into water and dive even when not disturbed, so that the habit would seem to be normal behaviour as well as a means of escape from danger.

There are no Guermontprez records.

For recent distribution see fig. 12.

*Tetrix undulata* (Sowerby) (Common Ground-Hopper)

This species is widespread throughout most of the county and often common on downland, heathland (where it may fill the waterside niche occupied on less acid soils by *T. subulata*) and in the more open parts of woods and plantations. It is, however, apparently absent from practically the whole of the coastal plain of West Sussex (except along Ferring Rife) and from the vicinity of Rye Harbour.

Guermontprez records: Cocking 1906; Slindon 1902 and 1903; Chilmington 1912. All specimens are labelled *Tetrix bipunctata* L.

For recent distribution see fig. 13.

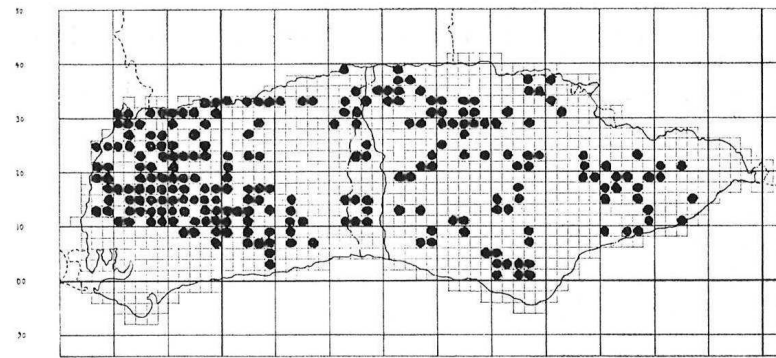
ACRIDIDAE (Grasshoppers)

Acridinae

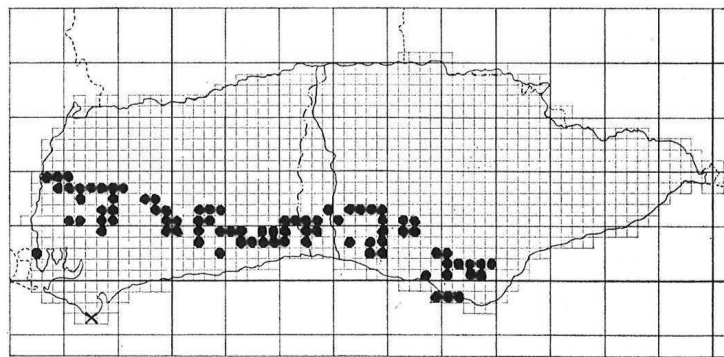
*Stenobothrus lineatus* (Panzer) (Stripe-winged Grasshopper)

Frequent and locally abundant along the South Downs, from the Hampshire border to Eastbourne. It is generally commonest in

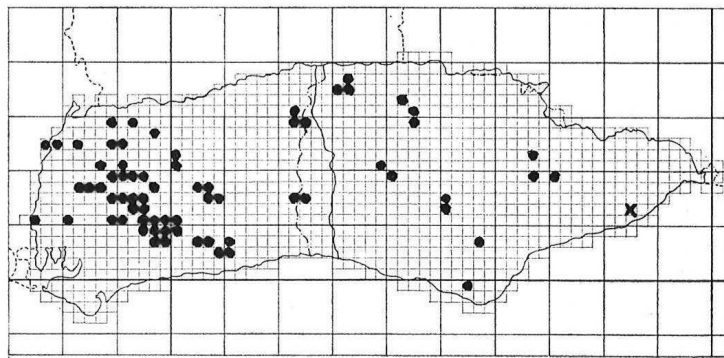




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Fig. 13. *Tetrix undulata* (Sowerby)Fig. 14. *Stenobothrus lineatus* (Panzer)Fig. 15. *Omocestus rufipes* (Zetterstedt)

south-facing coombes but is present along much of the north scarp of the Downs. The isolated colony on the west side of Thorney Island (between the Great and Little Deeps) is still the only non-downland colony known in the County, although hot dry sandy heathland, as on Iping Common might prove suitable, judging from its distribution in Berkshire or east Dorset.

Guermontez records: Selsea (sic.) 1898; Goodwood 1898 and 1899; Cocking 1894 and 1896; Graffham (presumably on downland and not heathland) 1911.

For recent distribution see fig. 14.

*Omocestus rufipes* (Zetterstedt) (Woodland Grasshopper)

In addition to its widespread presence and often local abundance in plantation rides, on chalk, clay with flints or heathland in West Sussex, it is now clear that the species is also quite widespread in East Sussex, although here much less numerous. In this vice-county it generally occurs in small colonies in rides and clearings of broad-leaved woods. There are also small heathland colonies on North Common Chailey and on the Ashdown Forest.

Guermontez record: Goodwood 1898. The specimen is labelled *Stenobothrus rufipes* Finot.

For recent distribution see fig. 15.

*Omocestus viridulus* (Linnaeus) (Common Green Grasshopper)

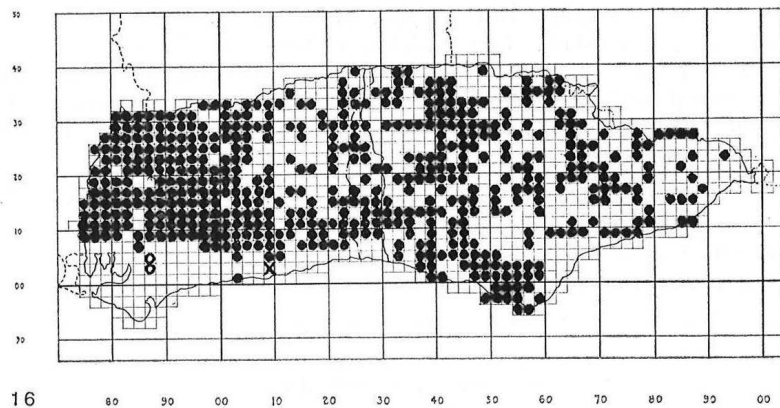
This grasshopper is common and widespread in lush or damp grassland throughout the county from the Downs northwards. South of the Downs there are only a very few isolated colonies and several of these, particularly in the vicinity of Chichester, have been destroyed by building since they were located in 1965-66. The species seems also to be absent from the Rye Harbour area. A small colony has persisted at Littlehampton Golf Course at least since 1965.

Guermontez records: Cocking 1893 and 1895; Heyshott 1897 and 1898; Goodwood 1899; Chiltington 1912; Amberley 1901, 1909 and 1910; Arundel 1902; Ferring 1894. All specimens are labelled *Omocestus viridulus* Steph.

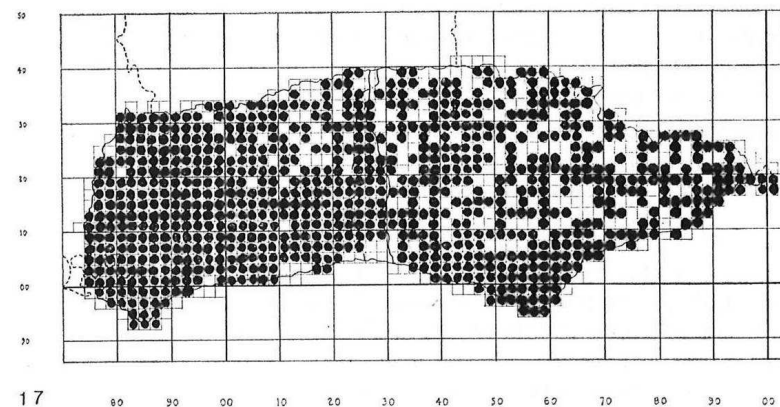
For recent distribution see fig. 16.

*Chorthippus parallelus* (Zetterstedt) (Meadow Grasshopper)

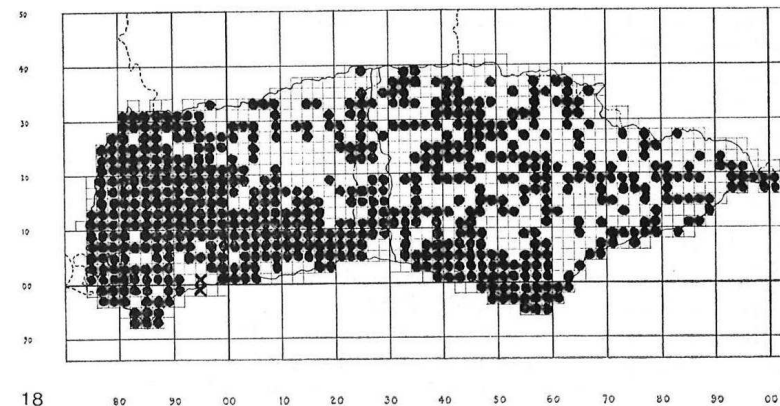
This is the commonest and most widespread Orthopteron in Sussex, and absent from only four of the tetrads examined. Two of these are in a very dry sandy area near Rogate; the other two are at Shoreham-by-Sea by the harbour, again in very dry hot situations, now completely isolated by urbanisation. I have noticed that where *C. albomarginatus* is particularly abundant the present species often appears to be quite scarce or, outside Sussex, even absent, for example at Spurn Head (Yorks) and Needs Ore Point (Hants).



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Fig. 16. *Omocestus viridulus* (Linnaeus)Fig. 17. *Chorthippus parallelus* (Zetterstedt)Fig. 18. *Chorthippus brunneus* (Thunberg)

Guernonprez records: Cocking 1904; Chiltington 1912; Felpham 1891 and 1898; Pagham Marsh 1897; Selsea 1898.

For recent distribution see fig. 17.

*Chorthippus brunneus* (Thunberg) (Common Field Grasshopper)

This species is locally common and widespread in Sussex and especially abundant on short dry turf on the Downs or in coastal areas. It may also be found on rough grass and banks well inside nearly all major towns in the county.

Distinct migrations of this species have been noted occasionally. (A considerable mass movement was seen in the Hastings area on 30.viii.1939.) I observed a small but unmistakable migration inland from the coast of Pagham on 21.viii.1974 during one of the few hot spells in the latter part of the mainly cold, wet summer.

Guernonprez records: Goodwood 1895 and 1897; Eartham 1897; Chillington 1912; Washington 1885; Felpham 1891; Pagham Marsh 1897; Selsea 1898. All specimens are labelled *Stauroderus bicolor* (Charp.).

For recent distribution see fig. 18.

*Chorthippus albomarginatus* (Degeer) (Lesser Marsh Grasshopper)

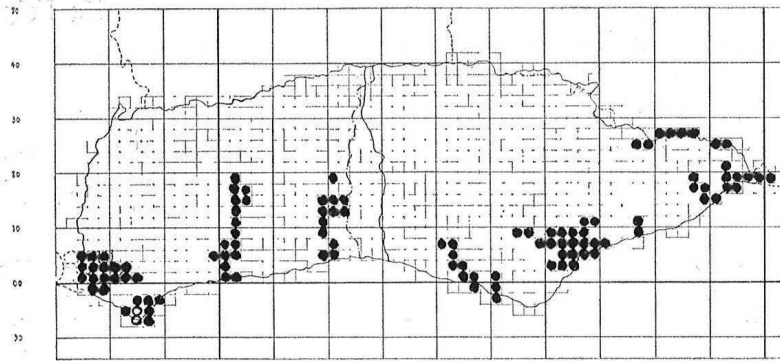
This species is undoubtedly the most common Orthopteron in the vicinity of the salt marshes and in the water meadows and dyke systems in the valleys of all the main rivers of the county except the West Sussex Rother. It is particularly common around Pagham and Chichester Harbour, in Amberley Wild Brooks, the Pevensey Levels and around Rye Harbour. It is also still present on the fragmentary remains of grass heathland near Henfield and at Milton Hide near Hailsham. Where this species occurs in abundance other grasshoppers tend to be scarce, but this may be due to some quality of the habitat rather than to direct competition. As mentioned in my previous paper, the lesser marsh grasshopper can withstand quite prolonged periods of inundation, a regular winter feature of the localities where it is particularly frequent. Possibly such inundation destroys most of the egg pods of other grasshoppers but those of this species are able to survive.

Guernonprez records: Pagham Marsh 1895 and 1897. The specimens are labelled *Chorthippus elegans* Charp.

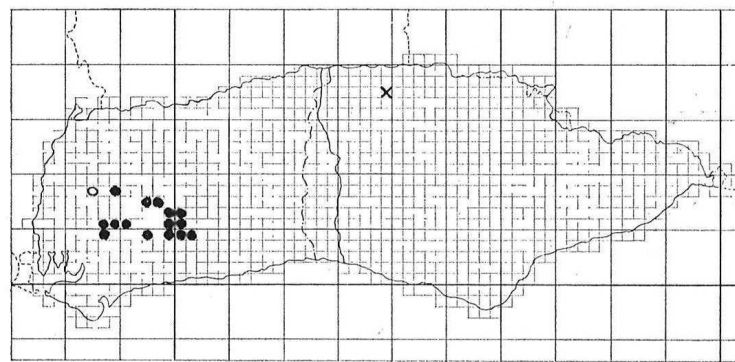
For recent distribution see fig. 19.

*Gomphocerippus rufus* (Linnaeus) (Rufous Grasshopper)

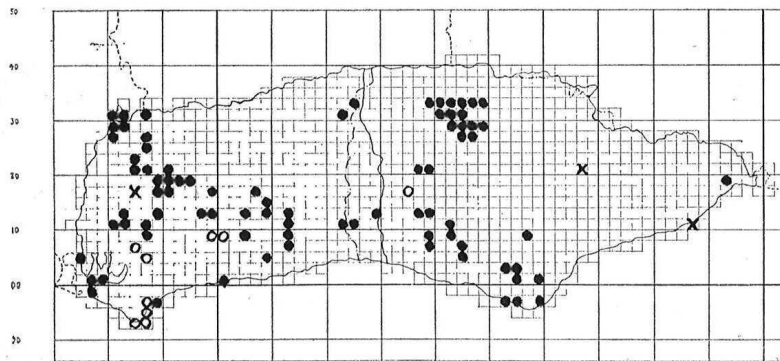
This species has still not been recorded recently in Sussex east of The Arun. The most westerly colony in the county at Linch Down seems to have been lost as result of the spread of scrub and the once strong colony at the Bishop's Rings near Duncton is now much reduced as result of chalk quarrying and track widening. The fine colony on open downland near the Trundle has obviously suffered from trampling now that the area has become very



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Fig. 19. *Chorthippus albomarginatus* (Degeer)Fig. 20. *Gomphocerippus rufus* (Linnaeus)Fig. 21. *Myrmeleotettix maculatus* (Thunberg)

popular for picnics and recreation. It is surely an important part of a good entomological education to witness the complex courtship of this attractive little grasshopper, and this may still be done without difficulty (in late summer) in Arundel Park, where it is abundant at the present time. It is also one of the last grasshoppers to die off and has been seen in most years in the first week of December in Sussex. Perhaps its habit of sheltering under fallen leaves at night or in bad weather enables it to survive long after most other Orthoptera have died off.

Guermontez records: Linch Down 1872; Cocking 1910; Eartham 1903; Goodwood Park 1898 and 1899. All specimens are listed as *Gomphocerus rufus* (L.).

For recent distribution see fig. 20.

#### *Myrmeleotettix maculatus* (Thunberg) (Mottled Grasshopper)

This is a very local grasshopper in Sussex. Its best colonies are on heathland. The scattered and usually small downland colonies are mostly in short turf where lichens are almost invariably present. Mr. G. R. Else has suggested (pers. comm.) that such lichened places on chalk may be well leached, so that the thin turf is growing in a layer of nearly lime free soil, which is perhaps necessary for the insect. Most of the small colonies around the Selsey peninsula have now been lost as a result of the spread of gorse bushes or building.

Guermontez records: Cocking Downs 1894; Heyshott Downs 1893; Eartham 1894; Chilmington 1892 and 1910. All specimens are labelled *Gomphocerus maculatus* Thunb.

For recent distribution see fig. 21.

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