

A provisional atlas of bush-crickets, grasshoppers and allied insects in 'old' Cambridgeshire

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Vice-county Recorder for Orthopteroids

Introduction

This article reviews the status, past and present, of the orthopteroids – Orthoptera (bush-crickets, crickets, ground-hoppers and grasshoppers), Dictyoptera (cockroaches) and Dermaptera (earwigs) – in 'old' Cambridgeshire (vice-county 29). Collectively these orders, together with the Phasmida (stick insects), are known as orthopteroids. No stick insects have been recorded in the wild in the vice-county.

The standard reference text for this group of animals is Marshall & Haes (1988). Ragge (1965), though dated today, is also still an excellent source of information, whilst Mahon (1988) and Brown (1990) offer cheap useful introductions to the Orthoptera. Bellmann (1988) provides a photographic field guide to the grasshoppers and crickets of Northern Europe and Sterry (1990) a good introduction to the identification of British grasshoppers, whilst Sterry (1991) covers the British bush-crickets. Grasshoppers, crickets and bush-crickets have very distinctive songs produced by stridulation, that is the rubbing of one part of the body against another; these are a very useful guide to species identification. A tape of these songs (Ragge, 1988) and, very recently, a book and compact disc (Ragge & Reynolds, 1998) have been produced.

Last year saw the publication of the new *Atlas of Grasshoppers, Crickets and Allied Insects in Britain and Ireland* (Haes & Harding, 1997). This book updates the original work on the distribution of orthopteroids in the British Isles as published by Skelton (1974) and subsequently updated within Marshall & Haes (1988). The new atlas clearly highlights the shortage of records from Cambridgeshire for a number of common species such as all species of bush-crickets and Meadow and Field Grasshoppers. This paucity of records from this vice-county and the adjacent ones of Huntingdonshire (v.c. 31) and Northamptonshire (v.c. 32) led to a request for additional records to fill these gaps from the national Orthoptera Recording Scheme organiser (Widgery, 1996b). At this point I volunteered to act as recorder for the three vice-counties, collecting new records, encouraging others to submit records and organising training courses on the identification of orthopteroids. Since then 204 new records (69% of the post-1980 records) have been collected, but unfortunately they were too late to meet the copy deadline for the new atlas. This paper therefore updates the new atlas with respect to species in v.c. 29.

Low recording in Cambridgeshire, Huntingdonshire and Northamptonshire is curious in view of the high numbers of potential recorders living in the three vice-counties. Many other vice-counties have made considerable progress and their local atlases have been published – for example, for Bedfordshire, Rands (1977), updated annually (e.g. Sharpe, 1995); for Devon, Davies (1987); for Berkshire, Buckinghamshire and Oxfordshire, Paul (1989); for Norfolk, Richmond & Irwin (1991); and, most recently, for Essex, Wake (1997). A provisional atlas for v.c. 31 will be published in 1998 (Colston, in press).

Historical data for 'old' Cambridgeshire

The first published account for Cambridgeshire is by Malcolm Burr (1904), based largely on the earlier fieldwork of the Victorian naturalist the Revd Leonard Jenyns. He describes 23 species: of these 20 are native, two are introductions and one is a migrant. His account provides an old record of the Short-winged Earwig and records for the Woodland Grasshopper, the latter now acknowledged as misidentifications.

The next published accounts are of Orthoptera occurring in Wicken Fen (Lucas, 1925, 1928) and of Cambridgeshire Dermaptera and Orthoptera by E.B. Worthington (1927), including recent records by himself, M. Perkins, W. Farren and others. The Victoria County History includes an updated summary (Worthington, 1938) of the last of these.

The formation of the Biological Records Centre in 1964 led to a renewed interest in recording and by 1980 195 records for orthopteroids in the vice-county had been received. Seven people contributed 85% of these records. Since 1980 a further 262 records have been added.

The systematic list

The systematic list which follows details the past and present status of species in the vice-county. In addition to the text, the tetrad maps show the post-1980 distribution of species. Table 1 summarises the 10-km records for Cambridgeshire – both pre-1980 and post-1980. Records made before 1980 are not included on the maps on account of the major land-use changes that have occurred in the vice-county and the known effect these have had on all types of wildlife (see Colston, 1997, for example). Figure 1 shows the actual number of records per species made in the vice-county since 1980. The national conservation status of each species is as given by Haes & Harding (1997), based upon Shirt (1987) and Ball (1986, 1994). Those species listed in *Cambridgeshire's Red Data Book* (Colston, Gerrard & Parslow, 1997) are labelled "CRDB".

Greenhouse Camel-cricket *Tachycines asynamorus* Adelung

Conservation status: not native; post-1980 10-km squares in v.c. 29: 0; 10-km squares where not recorded since 1980: 1.

Colonies of this species become temporarily established in heated greenhouses when it has been imported from abroad on plants. It is thought to have originated from southern China (Marshall & Haes, 1988).

There is a single anonymous record from v.c. 29, near Newmarket in 1913. The Botanic Garden in Cambridge is a potential source for future records.

Oak Bush-cricket *Meconema thalassinum* (De Geer) Map 1 (●)

Conservation status: not threatened; post-1980 10-km squares in v.c. 29: 7; 10-km squares where not recorded since 1980: 9.

This is a petite light green insect up to 17 mm long, with a yellow dorsal stripe. Nationally the Oak Bush-cricket is regarded as a common species (Haes & Harding, 1997); however, as it does not stridulate, it can often be difficult to locate and therefore to record. It is attracted to light and therefore often comes into people's homes at night and is caught in moth-traps. The species is probably under-recorded in the vice-county and is likely to occur throughout it.

Great Green Bush-cricket *Tettigonia viridissima* L. Map 1 (○)
 Conservation status: nationally local and CRDB; post-1980 10-km squares in v.c. 29: 2; 10-km squares where not recorded since 1980: 5.

This large bush-cricket (up to 54 mm) has a loud and distinctive song and it is unlikely that there are many (if any) undiscovered colonies in the vice-county.

Burr (1904) quoted Jenyns as describing the Great Green Bush-cricket as very common in the fens and elsewhere but said it appeared to be less common than formerly, while Worthington (1938) described it as formerly abundant in v.c. 29. Since 1980 it has been recorded in four separate sites.

Dark Bush-cricket *Pholidoptera griseoptera* (De Geer) Map 2 (●)
 Conservation status: not threatened; post-1980 10-km squares in v.c. 29: 13; 10-km squares where not recorded since 1980: 4.

The Dark Bush-cricket is a stout animal reaching a size of up to 20 mm. It is common in the south of Britain, and in Cambridgeshire it is reaching the edge of its northern limits. It is common in hedges and patches of scrub and will probably be found throughout v.c. 29 once more fieldwork has been done.

Recent studies from Norfolk (Richmond, 1994) have shown that this species is found only in 'Ancient Countryside' (Rackham, 1986), containing habitats such as old hedges and commons, and is absent from 'Planned Countryside' (i.e. the fens and intensively cultivated areas). In Cambridgeshire it is found on the clays and in the fens, i.e. in 'Planned Countryside'.

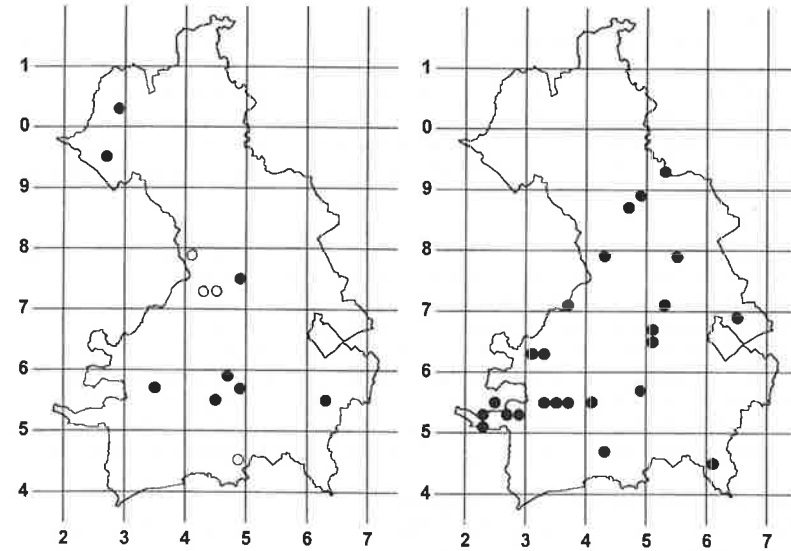
Roesel's Bush-cricket *Metrioptera roeselii* (Hagenbach) Map 3 (●)
 Conservation status: nationally scarce (B) and CRBD; post-1980 10-km squares in v.c. 29: 11; 10-km squares where not recorded since 1980: 0.

Roesel's Bush-cricket is a very attractive insect, brown in colour with a distinctive yellow arc and three yellow spots on the side of the pronotum/abdomen. It was formerly restricted to the Essex coast and the Thames estuary (Ragge, 1965), but it is currently undergoing an expansion of range in England, spreading west and north (see Haes, 1995, and Widgery, 1996b, for details).

The insect is best located by listening for its song. It has a very distinctive call which has been described as the sound emitted from under a high-tension electricity pylon in the rain! However weather conditions need to be still and hot to hear the song. This species was first recorded in 1996 at Upware by R. Fowling and by the end of 1997 a further 69 records had been received from 11 10-km squares. As can be seen in Figure 1, Roesel's Bush-cricket has over three times as many records as any other species – not bad for a species which has only been known in the vice-county for two years. It is to be hoped that this flurry of records also reflects an upturn in interest in the recording of Orthoptera generally. It will be interesting to see how far north the species spreads in the coming years and whether this range expansion will prove permanent or temporary.

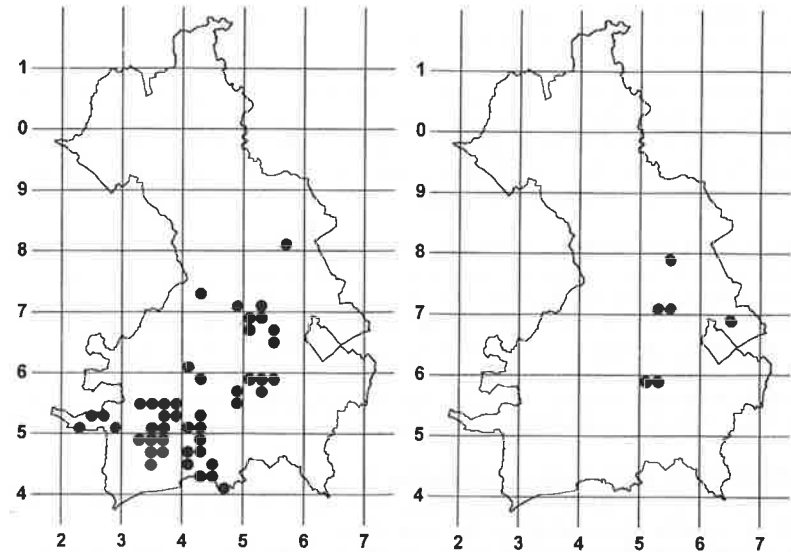
Short-winged Cone-head *Conocephalus dorsalis* (Lat.) Map 4 (●)
 Conservation status: nationally local and CRDB; post-1980 10-km squares in v.c. 29: 3; 10-km squares where not recorded since 1980: 1.

The Short-winged Cone-head is a small green bush-cricket (11–18 mm) with a brown dorsal stripe which inhabits marshes and fens. Its song is very



Map 1: ● Oak Bush-cricket
 ○ Great Green Bush-cricket

Map 2: ● Dark Bush-cricket



Map 3: ● Roesel's Bush-cricket

Map 4: ● Short-winged Cone-head

Distribution maps of Cambridgeshire orthopteroids (post-1980)

high-pitched and most people cannot hear it. However, if a bat detector is used, its presence can be quickly established.

This is another species undergoing a range expansion, sometimes over quite extensive distances. Indeed it does not seem to require extensive areas of marsh in which to survive, the colony on St Agnes in the Isles of Scilly being restricted to a marsh of less than one acre (personal observation). It is therefore worth surveying suitable habitat in Cambridgeshire to see if it is colonising new areas here as well. Currently the Short-winged Cone-head is found in six sites in the vice-county.

Speckled Bush-cricket *Leptophyes punctatissima* (Bosc) Map 5 (●)
 Conservation status: not threatened; post-1980 10-km squares in v.c. 29: 13; 10-km squares where not recorded since 1980: 3.

The Speckled Bush-cricket is a small (9–18 mm) dirty green animal with a distinctly arched back. It has a simple and almost inaudible song, but it can be located by beating bushes; it is also attracted to lights in houses and to moth-traps.

The species appears to be common in the south of Cambridgeshire, but there are no recent records from the north. Future recording will have to determine whether this is a real distribution pattern or merely an artefact of under-recording.

House-cricket *Acheta domestica* (L.)

Conservation status: not native; post-1980 10-km squares in v.c. 29: 0; 10-km squares where not recorded since 1980: 2.

The House-cricket is a small brown creature (up to 20 mm in size). It is not a native of Britain and is thought to have been brought to this country from the Middle East by knights returning from the Crusades. House-crickets can only survive in artificially heated conditions but can temporarily flourish in the wild during hot summers or in heat generated in rubbish tips. In the past the species was common, living in houses, bakeries, hospitals, etc., but, with improved hygiene procedures and intensive pest control, it is in rapid decline.

This species was last recorded in Cambridgeshire at Boxworth in 1973. House-crickets are now sold widely in pet shops as food for various carnivorous pets and occasionally escape.

Tree-cricket *Oecanthus pellucens* Fischer

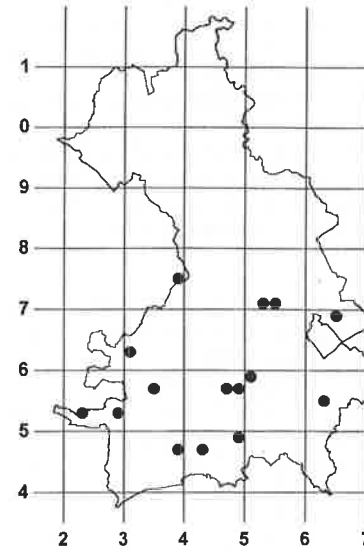
Conservation status: not native; post-1980 10-km squares in v.c. 29: 1; 10-km squares where not recorded since 1980: 0.

This species was first recorded in Britain in a large garden backing onto a lake with many mature trees in Barton Road, Cambridge, on 11 October 1996 by Lucy Cadbury. A tape of the song was sent to Chris Haes and Mike Edwards, who confirmed it as that of a tree-cricket, almost certainly *Oecanthus pellucens*. This is a widespread and common species in southern France.

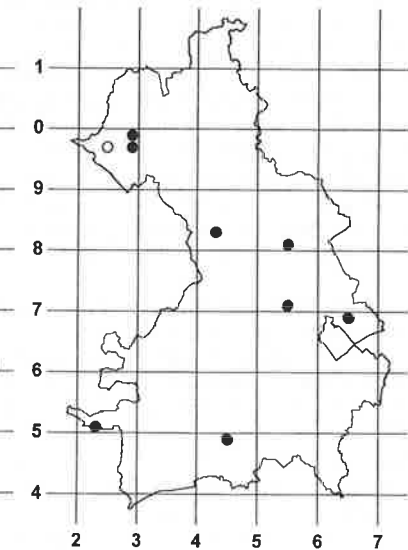
Mole Cricket *Gryllotalpa gryllotalpa* (L.)

Conservation status: RDB1 (endangered); post-1980 10-km squares in v.c. 29: 0; 10-km squares where not recorded since 1980: 2.

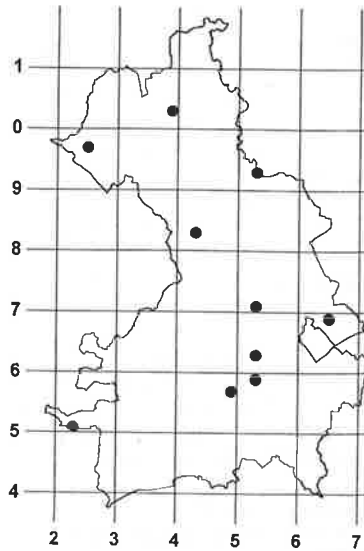
Burr (1904) reports that the Revd L. Jenyns described the species "In plenty at Fulbourn; in the park at Bottisham near the canal" early in the 19th century. There have been no further records and the species is presumed extinct.



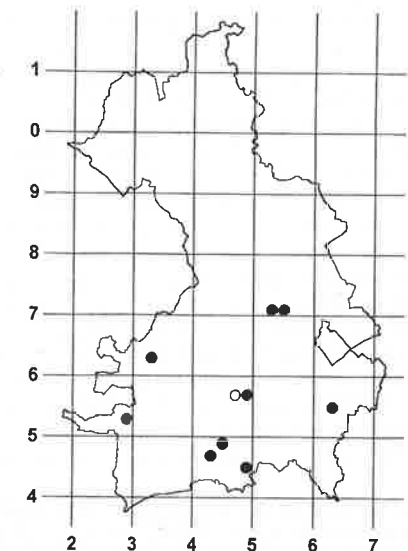
Map 5: ● Speckled Bush-cricket



Map 6: ● Slender Ground-hopper
 ○ Cepero's Ground-hopper



Map 7: ● Common Ground-hopper



Map 8: ● Common Green Grasshopper
 ○ Stripe-winged Grasshopper

Distribution maps of Cambridgeshire orthopteroids (post-1980)

The Mole Cricket is an endangered species in Great Britain and as a result is protected under section 5 of the Wildlife and Countryside Act 1981. It also forms part of English Nature's Species Recovery Programme and is on the shortlist of the U.K. Biodiversity Action Plan (Anon, 1995).

As a result of a recent conversation with one of the researchers on the Mole Cricket Species Recovery Programme, Bryan Pinchen, it has been suggested that searches of extensive intact areas of fen in the vice-county should be undertaken to look for the species, as it is believed that it may still be present. Apparently Mole Crickets can be extremely difficult to find and the adult males may only sing for one evening each year, so some detailed searches will be carried out in suitable habitat over the coming years.

Cepero's Ground-hopper *Tetrix ceperoi* (Bolivar) Map 6 (○)
Conservation status: nationally scarce (A) and CRDB; post-1980 10-km squares in v.c. 29: 1; 10-km squares where not recorded since 1980: 0.

This insect is normally considered to be a coastal species from southern Britain, but Peter Kirby found it in north Cambridgeshire near Whittlesey in 1995 – over 140 km north-west of any previous record and well inland (Widgery, 1996a). The site is a former brick-pit which experiences saline intrusions as a result of the underlying geology. The survival of the area is uncertain as it may in the future be threatened with infill.

This species is very difficult to separate from the Slender Ground-hopper and new records will only be accepted by the National Organisers of the Orthoptera Recording Scheme if a voucher specimen is provided.

Slender Ground-hopper *Tetrix subulata* (L.) Map 6 (●)
Conservation status: not threatened; post-1980 10-km squares in v.c. 29: 8; 10-km squares where not recorded since 1980: 4.

The Slender Ground-hopper is a small insect (up to 14 mm) which inhabits areas of bare mud or other unshaded damp places. Care needs to be taken that immature Slender Ground-hoppers (which still have short undeveloped wings) are not misidentified as Common Ground-hoppers.

This species is widely distributed in the vice-county but is still under-recorded. In v.c. 29 it is reaching the northern limits of its British distribution.

Common Ground-hopper *Tetrix undulata* (Sowerby) Map 7 (●)
Conservation status: not threatened; post-1980 10-km squares in v.c. 29: 10; 10-km squares where not recorded since 1980: 0.

The Common Ground-hopper is generally smaller than the Slender Ground-hopper, reaching only 11 mm. It is characterised by a pronounced dorsal keel on the pronotum (even in immature specimens). The insect requires open habitats containing mosses but lives in both wet and dry conditions. Its known distribution in Cambridgeshire is patchy as a result of under-recording.

Large Marsh Grasshopper *Stethophyma grossum* (L.)
Conservation status: RDB2 (vulnerable); post-1980 10-km squares in v.c. 29: 0; 10-km squares where not recorded since 1980: 2.

The Large Marsh Grasshopper is the largest species of grasshopper in Britain, reaching 36 mm. It is a wetland species which formerly inhabited the

great fen basin. Unfortunately it is now extinct in Cambridgeshire and East Anglia and is found today in Britain mainly on the Dorset heaths and in the New Forest.

The stronghold of this species in Cambridgeshire was Whittlesey Mere and fens around Ely before their drainage in the 19th century. At the current time major efforts are being made to restore a number of the ancient fen sites and it may prove feasible in the future to reintroduce the species to suitably restored nature reserves.

Stripe-winged Grasshopper *Stenobothrus lineatus* (Panzer) Map 8 (○)

Conservation status: nationally local and CRDB; post-1980 10-km squares in v.c. 29: 1; 10-km squares where not recorded since 1980: 0.

The Stripe-winged Grasshopper is a medium-sized grasshopper, up to 23 mm in length, which usually has a white stripe on the wing. It is a species of dry grasslands and is a good indicator of species-rich chalk grassland.

The species has only ever been recorded from one site in the vice-county, near Cherry Hinton, where it still persists today. The site is a small area of chalk grassland which is being invaded by scrub, though recent work by the Wildlife Trust should help to restore more suitable areas of habitat. The nearest colonies of the Stripe-winged Grasshopper are in the Breckland in Suffolk.

[Woodland grasshopper *Omocestus rufipes* (Zett.)

This species was recorded as common at Wicken Fen by G.T. Porritt (Burr, 1904), but it has subsequently been established that it was misidentified and the insects were actually Common Green Grasshoppers (Pickard, 1956; Kevan, 1961).]

Common Green Grasshopper *Omocestus viridulus* (L.) Map 8 (●)
Conservation status: CRDB; post-1980 10-km squares in v.c. 29: 6; 10-km squares where not recorded since 1980: 2.

This species grows up to 22 mm; it has a variety of colour forms but is most commonly green. It has a very characteristic prolonged song. It is an insect of unimproved wet meadows and wet woodland rides and is the most widely distributed species of grasshopper in the British Isles.

Common Green Grasshoppers have formerly been described as common; however there are only 10 post-1980 records (from nine sites) for the vice-county, despite extensive searching during recording of other more common species. The species may have undergone or is now undergoing a major decline resulting from the loss of wet meadows. As a result it is highlighted in *Cambridgeshire's Red Data Book* (Colston, Gerrard & Parslow, 1997) and efforts should be made to determine its current distribution in the vice-county and then to monitor its future progress.

Field Grasshopper *Chorthippus brunneus* (Thunb.) Map 9 (●)
Conservation status: not threatened; post-1980 10-km squares in v.c. 29: 11; 10-km squares where not recorded since 1980: 4.

The Field Grasshopper can reach sizes of up to 25 mm; it is usually brown and has a characteristically marked pronotum. It is widespread and common in

the British Isles, generally favouring dry habitats including road verges. It is no doubt much more common in Cambridgeshire than the records would suggest and further survey is needed to establish its current status.

Meadow Grasshopper *Chorthippus parallelus* (Zett.) Map 10 (●)

Conservation status: not threatened; post-1980 10-km squares in v.c. 29: 10; 10-km squares where not recorded since 1980: 4.

This is another widely distributed grasshopper, which can reach a length of 22 mm. The females have very reduced wings, which are diagnostic. The species appears to be common in the vice-county, being found in rough grassland including road verges, often in damper habitats than those used by the Field Grasshopper. It is no doubt much more common in Cambridgeshire than the present records indicate, but further survey work is required to show this.

Lesser Marsh Grasshopper *Chorthippus albomarginatus* (De Geer) Map 11 (●)

Conservation status: not threatened; post-1980 10-km squares in v.c. 29: 10; 10-km squares where not recorded since 1980: 14.

The Lesser Marsh Grasshopper is superficially similar in appearance and size to the Meadow Grasshopper. Haes & Harding (1997) state that the species has undergone a considerable range expansion over the past 30 years, spreading westwards from the east coast.

It was recorded in Cambridgeshire during the 19th century. Burr (1904) states: "This species occurs in a few scattered localities, but is usually numerous where it does occur." The first records after this are from Mark Skelton in the 1970s. The insect is now common in v.c. 29 (being probably its commonest grasshopper) and the main expansion is now occurring in Northamptonshire and beyond to the west. There is some evidence to suggest that the increase of the Lesser Marsh Grasshopper may lead to the decline of Field and Meadow Grasshoppers. Rands (1991) showed that in Bedfordshire this grasshopper was displacing both the other species as it expanded its range: in 1991 it had become the second most widespread species after the Field Grasshopper.

Mottled Grasshopper *Myrmeleotettix maculatus* (Thunb.) Map 10 (○)

Conservation status: CRDB; post-1980 10-km squares in v.c. 29: 1; 10-km squares where not recorded since 1980: 4.

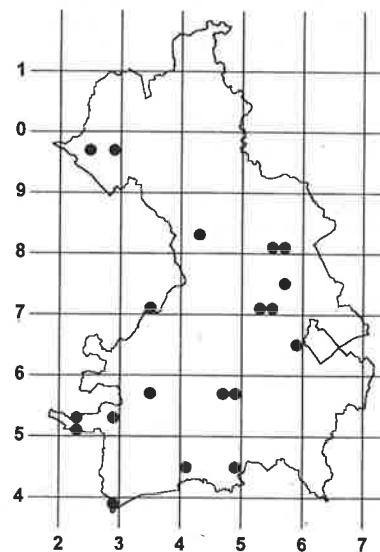
The Mottled Grasshopper is a small species (12–19 mm) with characteristic clubbed antennae. It is an insect of dry sunny places on sand, gravels or chalk.

There are early records by Jenyns from the Devil's Ditch, Newmarket Heath, Gamlingay and Wilbraham Temple (Burr, 1904) and from Wicken (Worthington, 1927), but the only recent record is by Brian Eversham from the disused railway sidings in March in 1997. Further surveys should be carried out to determine whether this species occurs elsewhere in the vice-county.

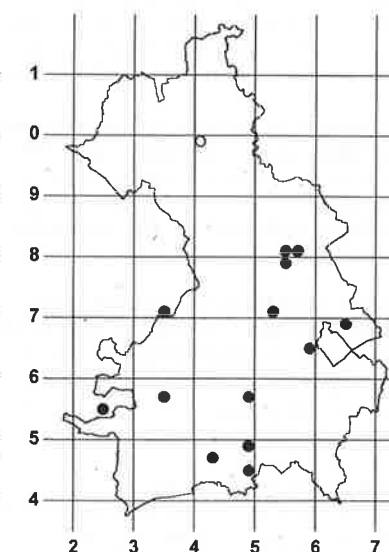
Common Cockroach *Blatta orientalis* L.

Conservation status: not native; post-1980 10-km squares in v.c. 29: 0; 10-km squares where not recorded since 1980: 1.

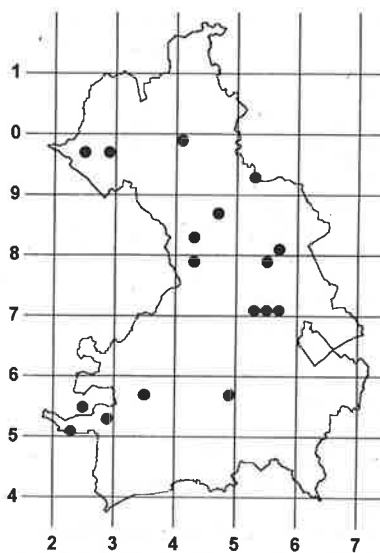
The Common Cockroach is not native to the British Isles, but it does become established from time to time in places where there is permanent heating such as



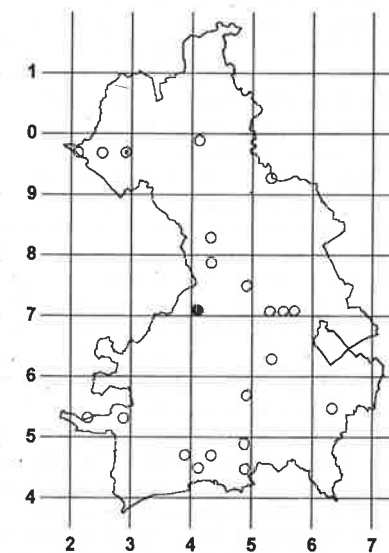
Map 9: ● Field Grasshopper



Map 10: ● Meadow Grasshopper
○ Mottled Grasshopper



Map 11: ● Lesser Marsh Grasshopper



Map 12: ● Lesser Earwig
○ Common Earwig
• Lesne's Earwig

Distribution maps of orthopteroids

restaurants, factories and hospitals. However, increased hygienic standards ensure that populations rarely survive permanently. There are no records for the vice-county since 1945 (BRC record), though no doubt it has been reported since then to Environmental Health Officers as opposed to ecologists.

Australian Cockroach *Periplaneta australasiae* (Fabricius)

Conservation status: not native; post-1980 10-km squares in v.c. 29: 0; 10-km squares where not recorded since 1980: 1.

This species is a large reddish cockroach usually found in the British Isles in horticultural hothouses. There is a single Cambridgeshire record from 1893, by D. Sharp from the Botanic Garden in Cambridge.

German Cockroach *Blattella germanica* (L.)

Conservation status: not native; post-1980 10-km squares in v.c. 29: 0; 10-km squares where not recorded since 1980: 1.

The status and occurrence of the German Cockroach mirrors that of the Common Cockroach. It has not been recorded in the vice-county since 1970, when it was reported from the New Museums Site, Cambridge (BRC record).

Lesser Earwig *Labia minor* (L.)

Map 12 (●)

Conservation status: CRDB; post-1980 10-km squares in v.c. 29: 1; 10-km squares where not recorded since 1980: 3.

This is the smallest earwig in Europe, reaching only 6 mm in length. It can be mistaken for a small or immature Common Earwig, as its small folded wings protrude from under the elytra, but Hawes (1997) gives a clear method of separating the two species based on the shape of the second tarsal segment, which in the Lesser Earwig is not expanded. His paper also includes a superb colour photograph by Chris Timmins of a Lesser Earwig about to fly.

This insect has been recorded from only four localities in the vice-county, most recently from Willingham by Peter Kirby in 1981, though Burr (1904) described it as "Common in the summer, often seen on the wing in company with *Staphylinidae*, over flower beds and dungheaps."

It is considered that this species is greatly under-recorded, as it appears to reside in dungheaps in farmyards and stables. Widgery (1997a, 1997b) details a method of surveying for it, using a trowel, which has proved very successful in Gloucestershire, where the success rate was nearly 100%, with 14 new 10-km records added in two weeks. No doubt the Lesser Earwig is more widespread in Cambridgeshire than current records indicate.

Short-winged Earwig *Apterygida media* (Hagenbach)

Conservation status: nationally scarce (B); post-1980 10-km squares in v.c. 29: 0; 10-km squares where not recorded since 1980: 1.

This species, also known as the Hop-garden Earwig, is reddish-brown with a body length of up to 10 mm. It was formerly found in hop gardens but today is found in sunny thickets and woodland edges.

There is a single 19th-century record for Cambridgeshire in Burr (1904), by Professor C.C. Babington in Cambridge. Today it is a rare species recorded only from Kent and Suffolk. It is possible that isolated colonies still remain in the vice-county undiscovered.

Common Earwig *Forficula auricularia* L.

Map 12 (○)

Conservation status: not threatened; post-1980 10-km squares in v.c. 29: 14; 10-km squares where not recorded since 1980: 3.

The Common Earwig is familiar to everyone with its characteristic pincers. It can reach a length of 15 mm. It is found in a wide variety of situations including houses, under stones and logs, and in rough grassland. With more thorough surveying it will no doubt prove to be ubiquitous throughout v.c. 29.

Lesne's Earwig *Forficula lesnei* Finot

Map 12 (●)

Conservation status: nationally scarce (B) and CRDB; post-1980 10-km squares in v.c. 29: 1; 10-km squares where not recorded since 1980: 0.

Lesne's Earwig is a small species (up to 7 mm) which can be distinguished from Common and Lesser Earwigs by the absence of hindwings. It is a very elusive species which lives in oak woodland, chalk scrub, hedgerows and nettle beds and is best located by beating bushes. There is a single record for Cambridgeshire, by Peter Kirby at Lattersey in 1986. It is likely that with more survey work the species will be found to be more common, although very local.

Table 2: Conservation action for Cambridgeshire's orthopteroids

Species of national importance targeted for action in the U.K. Biodiversity Action Plan (Anon, 1995)	Mole Cricket • Wildlife and Countryside Act 1981, Schedule 5. • Biodiversity Action Plan shortlist – priority sp. • Species Recovery Programme. • may be extant in v.c. 29, but possible candidate for reintroduction.
	Large Marsh Grasshopper • RDB2 (vulnerable). • Biodiversity Action Plan middle list – priority sp. • possible candidate for reintroduction to v.c. 29.
Species of local importance targeted for action in Cambridgeshire's Biodiversity Action Plan (Anon, 1997)	Great Green Bush-cricket • Protect existing sites.
	Roesel's Bush-cricket • Monitor range expansion.
	Short-winged Cone-head • Protect existing sites, search for new sites and create new wetlands.
	Cepero's Groundhopper • Protect existing site and search for new sites.
	Stripe-winged Grasshopper • Protect and manage existing site.
	Common Green Grasshopper • Protect existing sites and create new wet grasslands.
	Mottled Grasshopper • Protect existing site and search for new sites.
Lesne's Earwig • Protect existing site and search for new sites.	

Conservation

The systematic list shows that a number of species have undergone declines in distribution and that others appear to be intrinsically rare and are therefore in need of conservation. Other species which are now extinct in Cambridgeshire could in the future be reintroduced if suitable habitats could be restored. The conservation of our orthopteroids is fortunately now being addressed as a result of the upsurge in invertebrate conservation initiatives largely resulting from the publication of the U.K. Biodiversity Action Plan (Anon, 1995) and Cambridgeshire's local version (Anon, 1997). Table 2 summarises the species that it is hoped will benefit from national and local conservation action.

The future

It is clear from the above text and the maps that there is great potential for further recording of this group in Cambridgeshire, particularly in the north of the vice-county. It is also clear that the status and distribution of orthopteroids in the country is fluid, with many changes to be expected in the future, and that conservation action for a number of species is required.

Several species appear to be undergoing range expansions, such as Roesel's Bush-cricket and the Short-winged Cone-head. The Long-winged Cone-head *Conocephalus discolor* (Thunb.) is also undergoing a range expansion and is now common in Hertfordshire and within 500 metres of the Cambridgeshire vice-county boundary (Widgery, 1998 and pers. comm.); it is most likely that this species will be recorded in the vice-county during 1998. There are also, of course, all the obvious gaps still to fill for the common species.

Finally, it is useful also to put Cambridgeshire into a national perspective. Table 3 compares the orthopteroid faunas of Cambridgeshire, Huntingdonshire, Northamptonshire and Dorset and shows how species number is related both to recording effort and to latitude. Dorset is a well-recorded vice-county which also enjoys a southerly climate, a coastline and a number of rich habitat types. Cambridgeshire, Huntingdonshire and Northamptonshire, on the other hand, are less well recorded, lack coastlines, are further north and have also lost proportionately more species-rich habitat. With additional recording and conservation effort a vice-county such as Cambridgeshire might expect some new species (such as Long-winged Cone-head, Mole Cricket and Large Marsh Grasshopper), but it will never be as species-rich as Dorset.

Table 3: Comparison of orthopteroids in Cambridgeshire, Huntingdonshire, Northamptonshire and Dorset

Vice-county	Native species recorded post-1980	Percentage of 34 mainland native species
'Old' Cambridgeshire, v.c. 29 (this paper)	18	53%
Huntingdonshire, v.c. 31 (Colston, in press)	14	41%
Northamptonshire, v.c. 32 (BRC and personal records)	13	38%
Dorset, v.c. 9 (Mahon, 1992)	31	91%

BRC recording cards (RA4B and GEN7) can be obtained from the Biological Records Centre, Monks Wood, Abbots Ripton, Huntingdon, PE17 2LS. Completed cards should be sent to me, Adrian Colston, The National Trust, Wicken Fen N.N.R., Lode Lane, Wicken, Ely, Cambridgeshire, CB7 5XP. I am also happy to identify specimens if required. In addition to future records I should be very pleased to receive details of any other published records of orthopteroids in Cambridgeshire which I have missed.

Details of the Orthoptera Recording Scheme for Great Britain and Ireland can be obtained from the national co-ordinator John Widgery, 21 Field View Road, Potters Bar, Hertfordshire, EN6 2NA.

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