

Bush-Crickets, Grasshoppers & Allied Insects

A provisional atlas for Northamptonshire and the Soke of Peterborough

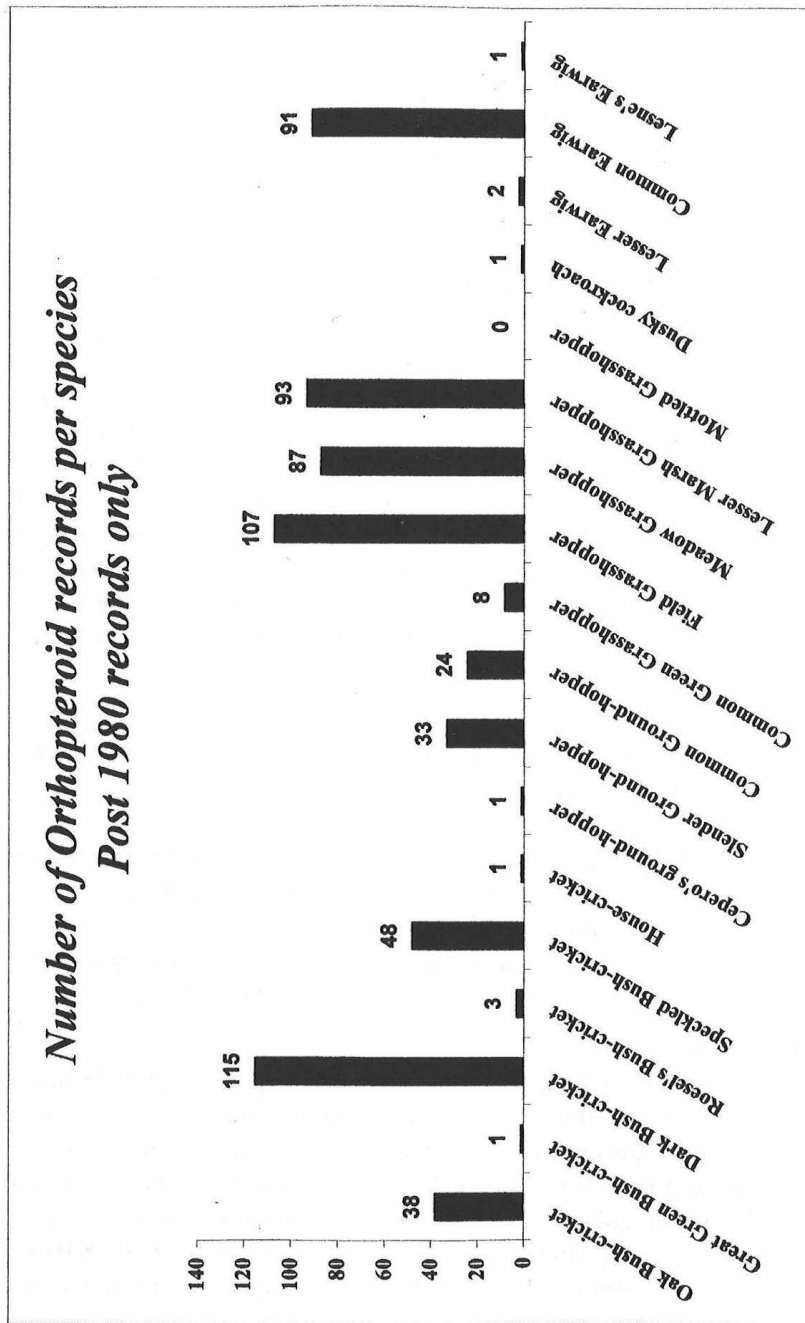
Adrian Colston,

Introduction

This article reviews the status, past and present, of Orthopteroids: Orthoptera (bush-crickets, crickets, ground-hoppers and grasshoppers); Dictyoptera (cockroaches) and Dermaptera (earwigs) in vice county 32 – Northamptonshire and the Soke of Peterborough. Collectively these orders along with the Phasmida (stick insects) are known as the Orthopteroids. No stick insects have been recorded in the wild in the county.

The standard reference text for this group of animals is Marshall & Haes (1988). Ragge (1965), while dated today is also still an excellent source of information with Brown (1983) and Mahon (1988) offering cheap useful introductions to the orthoptera. Bellman (1985) is a photographic field guide to the grasshoppers and crickets of Northern Europe and Sterry (1990) provides 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 the stridulations of their wings or thoraxes which are a very useful guide to species identification. A tape of these songs has been produced (Ragge 1988) and a new book and compact disc have recently been published (Ragge & Reynolds 1998).

1997 saw the publication of the new 'Atlas of grasshoppers, crickets and allied insects in Britain and Ireland' (Haes & Harding 1997). This book updates the distribution of orthopteroids in the UK as published by Skelton (1974) and contained within Marshall & Haes (1988). The new Atlas clearly highlights the lack of records from Northamptonshire for a number of common species such as all species of bush-cricket along with meadow and field grasshoppers. This paucity of records from the county (and the adjacent counties of Cambridgeshire vc29 and Huntingdonshire vc31) 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 county recorder for those three vice counties, collecting new records, encouraging others to submit records and organising training courses on the identification of orthopteroids. 361 new records have subsequently (52% of the post 1980 records) been collected but unfortunately they were too late to meet the copy deadlines for the new Atlas. This paper therefore updates the new atlas with respect to species in vc 32.



The paucity of records for Northamptonshire is curious considering the high numbers of potential recorders living in the county. Many other counties have made considerable progress and their local Atlases have been published (e.g. Rands, 1977: Bedfordshire, updated annually e.g. Sharpe 1995; Davies 1987: Devon; Paul 1989: Berkshire, Buckinghamshire and Oxfordshire; Richmond & Irwin 1991: Norfolk Wake 1997: Essex; Colston 1998a): Huntingdonshire, updated annually Colston 1999a); Colston 1998b): Cambridgeshire, updated annually Colston 1999b) and most recently Baldock 1999: Surrey).

Historical data for Northamptonshire and the Soke of Peterborough

No historic data is known for the orthoptera in vc 32. Indeed the Victorian County History Adkins & Serjenatson (1902) states only the following.

"With the exception of the *Lepidoptera* (butterflies & moths), the *Coleoptera* (beetles) and a few of the *Hymenoptera* (bees, wasps etc), the insects of Northamptonshire appear to be almost entirely unknown and all efforts to obtain lists of the *Orthoptera* (grasshoppers, crickets etc) the *Neuroptera* (dragonflies, caddisflies) the *Diptera* (flies) and the *Hemiptera* (bugs) have been unsuccessful. Probably the chief reason for the comparative neglect of Northamptonshire by entomologists is that its natural conditions are far less varied than those of some other midland counties.....an inland county without any very important range of hills or mountains, and no extensive tracts of moor or fenland may not produce a great variety of species".

Up to 1960 only 17 records representing 11 species (*Acheta domesticus*, *Chorthippus brunneus*, *Chorthippus parallelus*, *Ectobius lapponicus*, *Labia minor*, *Meconema thalassinum*, *Myrmeleotettix maculatus*, *Omocestus viridulus*, *Pholidoptera griseoptera*, *Tetrix subulata* and *Tettigonia viridissima*) have been found.

The formation of the Biological Records Centre in 1964 led to a minor upsurge in recording; by 1980 40 more records had been received which yielded three more species *Chorthippus albomarginatus*, *Leptophyes punctatissima* and *Tetrix undulata*. Since 1980 a further 650 records have been added - 338 since 1996 yielding a further four species (*Metroptera roeselii*, *Tetrix ceperoi*, *Forficula lesnei* and *Forficula auricularia*).

The Systematic List

The systematic list that follows details the past and present status of species in the county. In addition to the text, the tetrad maps show the **pre** and **post 1980** distribution of species. Table 1 summarises the 10km records for Northamptonshire – pre 1980 and post 1980. Figure 1 shows the actual number of records per species recorded in the county since 1980. The conservation status of each species follows Haes and Harding (1997) after Shirt (1987) and Ball (1986 & 1994) for national designations. Colston et al (1996) gave a local RDB status for species in Northamptonshire, however this was prior to the collecting of much of the data in

this paper – therefore these statuses have not been used but new ones are proposed (NRDB) which are discussed in the Conservation section

Oak Bush-cricket (*Meconema thalassinum*).

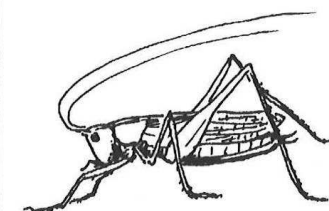
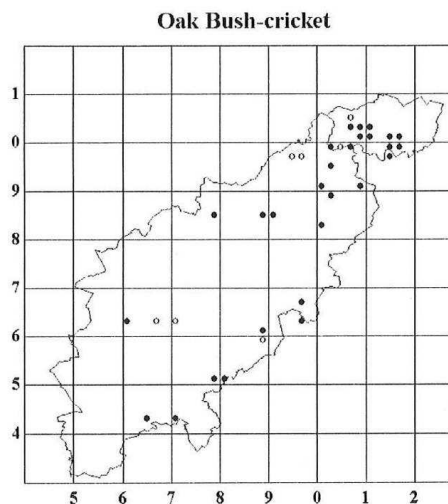
Conservation Status: not threatened;

Post 1980 10km squares in VC32: 15;

10km squares where not recorded since 1980: 2;

Number of pre 1980 records: 3;

Number of post 1980 records: 38



A petite light green insect with a yellow dorsal stripe – up to 17mm. Nationally the oak bush-cricket is regarded as a common species (Haes and Harding 1997) however as the species does not stridulate it can often be difficult to locate and therefore record. The species is attracted to light and therefore often comes into people's home at night and is caught in moth traps. The species is clearly under-recorded particularly in the west of the county but is likely to occur throughout.

Great Green Bush-cricket (*Tettigonia viridissima*)

Conservation Status: Nationally local and NRDB

Post 1980 10km squares in VC32: 1

10km squares where not recorded since 1980: 1

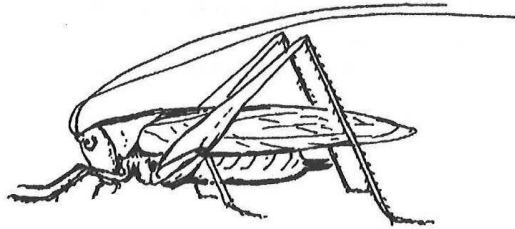
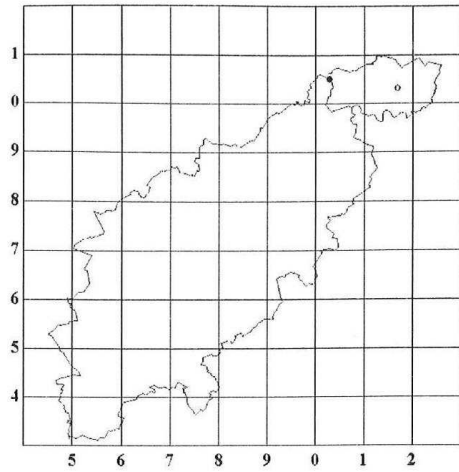
Number of pre 1980 records: 1

Number of post 1980 records: 1

This large bush-cricket (up to 54mm) has been recorded only twice in the county. There is an anonymous record from 1920 from Walton station in Peterborough. The second record was on the 29th August 1999 from Wothorpe when

Philip Rudkin found a single stridulating male in a buddleia bush. At this point it is not clear whether this represents a breeding colony or an aberrant individual.

Great Green Bush-cricket



Dark Bush-cricket (*Pholidoptera griseoaptera*)

Conservation Status: not threatened

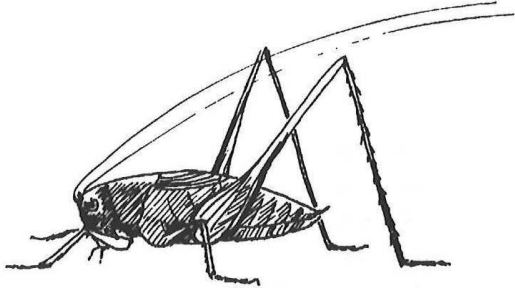
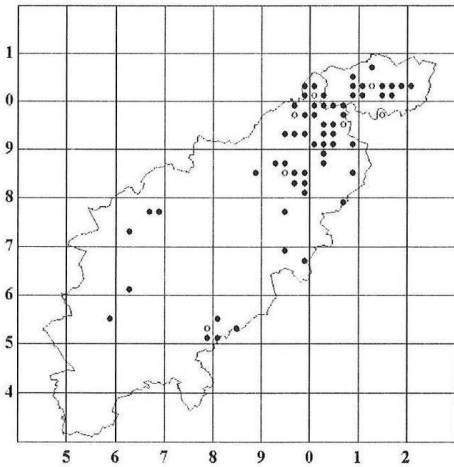
Post 1980 10km squares in VC32: 17

10km squares where not recorded since 1980: 0

Number of pre 1980 records: 12

Number of post 1980 records: 115

Dark Bush-cricket



This species is a stout animal reaching a size of up to 20mm. The dark bush-cricket is common in the south of Britain and in Northamptonshire it is reaching the edge of its northern limits. The species is common in hedges and patches of scrub and will probably be found throughout the county once further field work has been carried out..

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

[Bog Bush-cricket (*Metrioptera brachyptera*)

There is a single record for this species in the Invertebrate Site Register from Yardley Chase. This record has been rejected nationally and locally owing to the absence of a voucher specimen and the unlikely nature of the record. The Bog Bush-cricket is only recorded elsewhere in the UK from acid heaths and bogs.]

Roesel's Bush-cricket (*Metrioptera roeselii*)

Conservation Status: Nationally Scarce (B) & NRDB

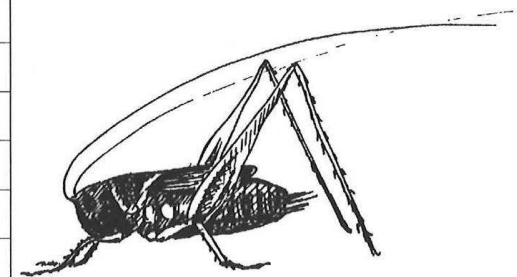
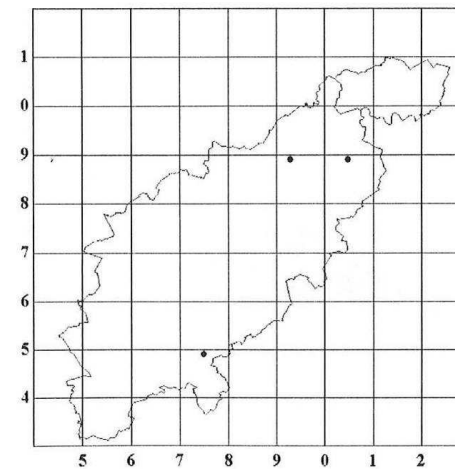
Post 1980 10km squares in VC32: 3

10km squares where not recorded since 1980: 0

Speckled Bush-cricket (*Leptophyes punctatissima*)

Number of post 1980 records: 3

Roesel's Bush-cricket



Roesel's bush-cricket is a very attractive insect, brown in colour with a distinctive yellow arc along with three yellow spots on the side of the pronotum / abdomen. The species was formerly restricted to the Essex coast and the Thames

estuary (Ragge 1965). However it is currently undergoing a range expansion in England spreading west and north (see Haes 1995 for further details).

The species 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.

The species was first recorded in Northamptonshire in 1999. The first record coming from Ashton Dragonfly Sanctuary (TL0588) on the 31st July when a number of individuals were located by Henry Stanier. On 2nd August a further colony was found at Stoke Bruerne Brick Pits (SP7449) by Chris Gerrard and Adrian Colston. The third record came from Weldon (SP9289) a day later.

Roesel's Bush-cricket was first recorded in Cambridgeshire in 1996 (see Colston 1998c for details) and it is likely that the species established itself in Northamptonshire prior to 1999 as the Ashton and Weldon records are nearing the north of the county. Efforts should be made in coming years to try and map the species' colonisation of the county.

Speckled Bush-cricket (*Leptophyes punctatissima*)

Conservation Status: not threatened

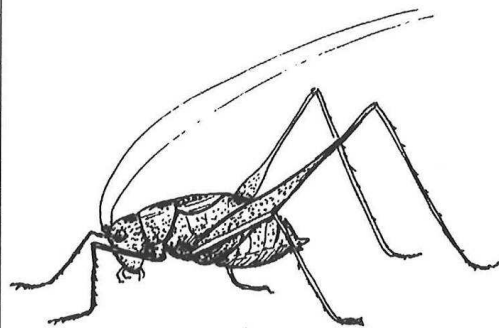
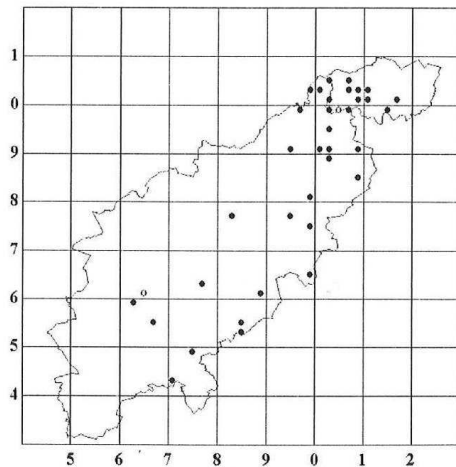
Post 1980 10km squares in VC32: 16

10km squares where not recorded since 1980: 1

Number of pre 1980 records: 3

Number of post 1980 records: 48

Speckled Bush-cricket



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

and to moth traps. The species is best found using a bat detector which picks up its distinctive clicks.

It is likely that this species is ubiquitous and is therefore currently under-recorded.

House-cricket (*Acheta domestica*)

Conservation Status: not native

Post 1980 10km squares in VC32: 1

10km squares where not recorded since 1980: 1

Number of pre 1980 records: 1

Number of post 1980 records: 1

The house-cricket is a small brown creature (up to 20mm in size). It is not a native of the U.K. and is thought to have been brought to the country from the Middle East by the knights returning from the Crusades. House-crickets can only survive in artificially heated conditions but can temporarily flourish in the wild during hot summers. In the past the species was common living in houses, bakeries and hospitals etc. However with improved hygiene procedures and intensive pest control the species is in rapid decline. The house-cricket was last recorded in VC32 in Peterborough in 1991. The species is now sold widely in pet shops as food for various carnivorous pets and occasionally escapes.

Mole cricket (*Gryllotalpa gryllotalpa*)

Conservation Status: RDB1.

Post 1980 10km squares in VC32: 0

10km squares where not recorded since 1980: ?

Number of pre 1980 records: ?

Number of post 1980 records: 0

The mole cricket is an endangered species in the U.K. and as a result is protected under section 5 of the 1981 Wildlife & Countryside Act. It also forms part of English Nature's Species Recovery Programme and is on the short list of the UK Biodiversity Action Plan (Anon 1995). Marshall J.A. & Haes E.C.M. (1988) suggest that the Mole cricket may have been recorded formerly in Northamptonshire, however it has not been possible to locate the origin of this potential record.

Cepero's Ground-hopper (*Tetrix ceperoi*)

Conservation Status: Nationally scarce (A) & NRDB

Post 1980 10km squares in VC32: 1

10km squares where not recorded since 1980: 0

Number of pre 1980 records: 0

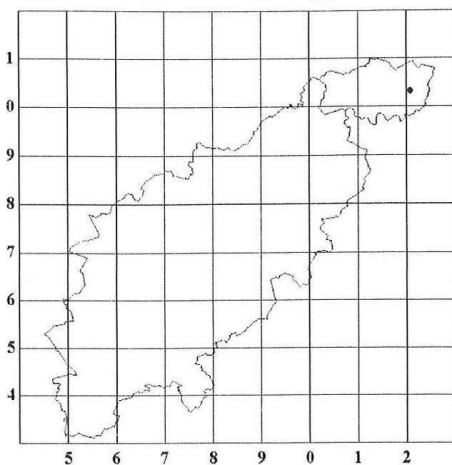
Number of post 1980 records: 1

This species is normally considered as a coastal species from southern Britain.

Peter Kirby however found the species in a brick pit in north Cambridgeshire (VC29) near Whittlesey in 1995 – over 140km north-west of any previous record and well inland (Widgery 1996a). Subsequently he also found the species at Dogsthorpe Star Pit in VC32 in September 1997.

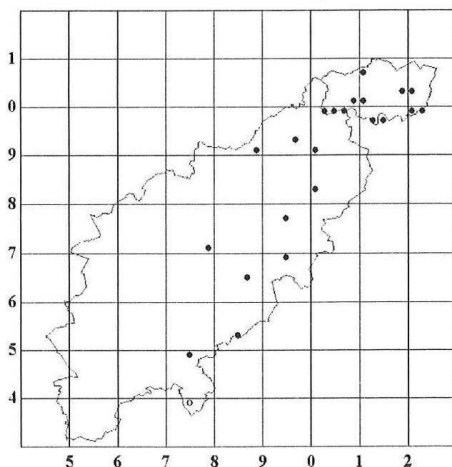
It is very difficult to separate from the slender ground-hopper and new records will only be accepted by the National Organisers of the Orthoptera Recording Scheme if a voucher specimen is provided.

Cepero's Groundhopper



Slender Ground-hopper (*Tetrix subulata*)

Slender Groundhopper



Conservation Status: not threatened

Post 1980 10km squares in VC32: 15

10km squares where not recorded since 1980: 1

Number of pre 1980 records: 1

Number of post 1980 records: 33

The slender ground-hopper is a small insect (up to 14mm) which inhabits areas of bare mud or other unshaded damp places. Care needs to be taken so that immature slender ground-hoppers (which still have short undeveloped wings) are not misidentified as common ground-hoppers. The species is widely distributed in the county but is still under-recorded especially in the west. In VC32 it is reaching the northern limits of its UK distribution.

Common Ground-hopper (*Tetrix undulata*)

Conservation Status: not threatened

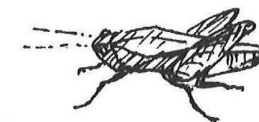
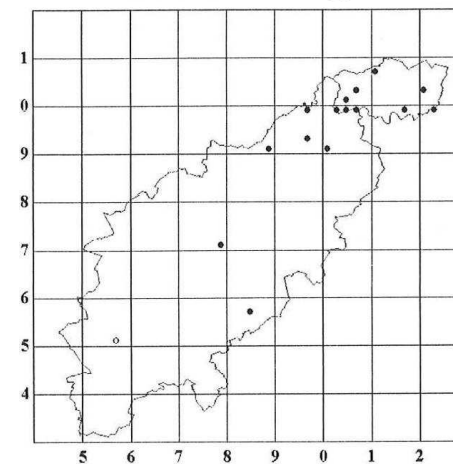
Post 1980 10km squares in VC32: 10

10km squares where not recorded since 1980: 1

Number of pre 1980 records: 2

Number of post 1980 records: 24

Common Groundhopper



The common ground-hopper is generally smaller than the slender ground-hopper reaching only 11mm. It is characterised by a pronounced dorsal keel on the pronotum (even in immature specimens). It requires open habitats containing mosses but lives in both wet and dry conditions. It has a patchy distribution in the county resulting from under-recording particularly in the south and west.

Common Green Grasshopper (*Omocestus viridulus*)

Conservation Status: NRDB

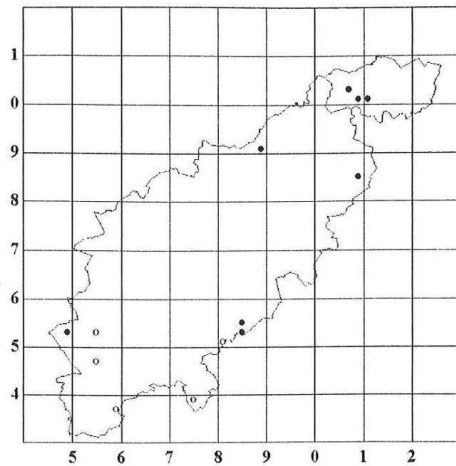
Post 1980 10km squares in VC32: 6

10km squares where not recorded since 1980: 4

Number of pre 1980 records: 7

Number of post 1980 records: 8

Common Green Grasshopper



It has a very characteristic prolonged song. It is a species of unimproved wet meadows and wet woodland rides. It is the most widely distributed species of grasshopper in the UK.

Common green grasshoppers have formerly been described as common, however there are only 8 post 1980 records (from 7 sites) for the county despite extensive searching whilst recording other more common species. The species may have undergone / is undergoing a major decline resulting from the loss of wet meadows. As a result it is highlighted in the Northamptonshire Red Data Book (Colston et al. 1996) and efforts should be made to determine its current distribution in the county and then monitor its future progress.

Field Grasshopper (*Chorthippus brunneus*)

Conservation Status: not threatened

Post 1980 10km squares in VC32: 28

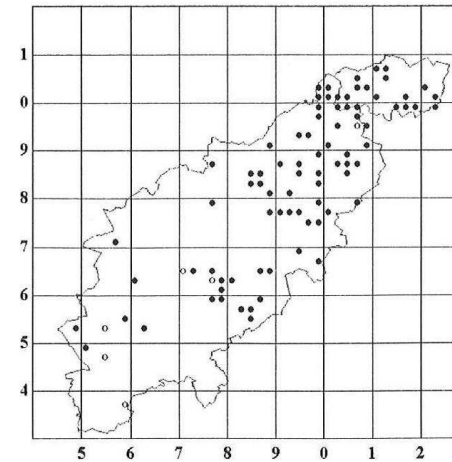
10km squares where not recorded since 1980: 1

Number of pre 1980 records: 9

Number of post 1980 records: 107

The field grasshopper can reach sizes of up to 25mm, it is usually brown and has a characteristically marked pronotum. It is widespread and common in the UK, generally favouring dry habitats including road verges. It is no doubt much more common in Northamptonshire than records would suggest, further survey is needed to establish its current status.

Field Grasshopper



Meadow Grasshopper (*Chorthippus parallelus*)

Conservation Status: not threatened

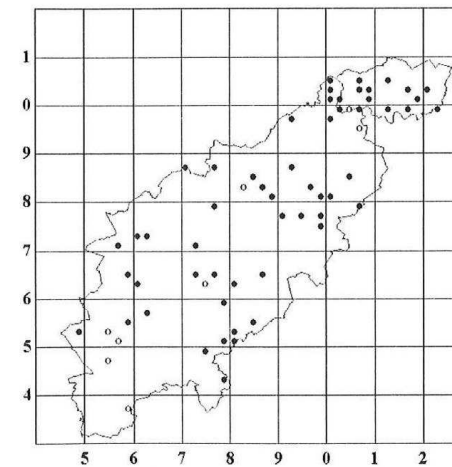
Post 1980 10km squares in VC32: 26

10km squares where not recorded since 1980: 2

Number of pre 1980 records: 9

Number of post 1980 records: 87

Meadow Grasshopper



Another widely distributed grasshopper which can reach sizes of 22mm. The females have very reduced wings which are diagnostic. The species is common in the county and is often found in rough grassland including road verges and is often in

damper habitats than those used by the field grasshopper. It is no doubt more common in Northamptonshire but further survey will be required to show this, as it is currently much under-recorded.

Lesser Marsh Grasshopper (*Chorthippus albomarginatus*)

Conservation Status: not threatened

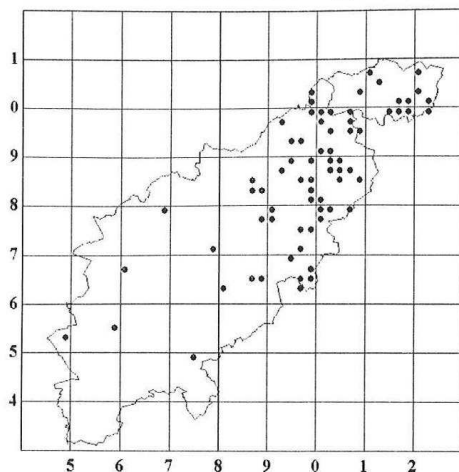
Post 1980 10km squares in VC32: 22

10km squares where not recorded since 1980: 0

Number of pre 1980 records: 1

Number of post 1980 records: 93

Lesser Marsh Grasshopper



The lesser marsh grasshopper is superficially similar in appearance and size to the meadow grasshopper. Haes and Harding (1997) state that the species has undergone a considerable range expansion over the past 30 years spreading westwards from the east coast.

The species was not recorded in Northamptonshire until 1973 by Mark Skelton. The second record occurred in the late 1980s and the full extent of its distribution was not established until the late 1990s. As a result the lesser marsh grasshopper was included in the Northamptonshire Red Data Book (Colston et al. 1996). The species is now common in the county indeed it is probably the commonest grasshopper in VC32.

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 the lesser marsh grasshopper was displacing both species as it expanded its range. The lesser marsh grasshopper had in 1991 become the second most widespread species after the field grasshopper.

Mottled Grasshopper (*Myrmelerotettix maculatus*)

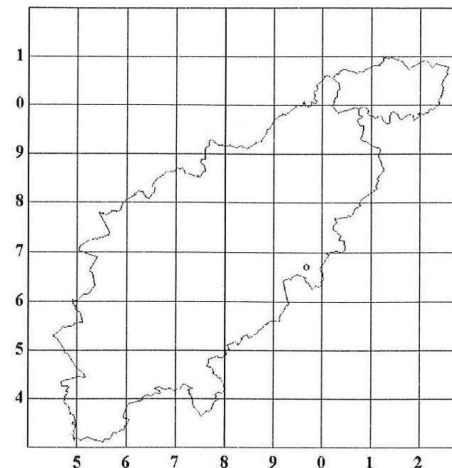
Post 1980 10km squares in VC32: 0

10km squares where not recorded since 1980: 1

Number of pre 1980 records: 1

Number of post 1980 records: 0

Mottled Grasshopper



The mottled grasshopper is a small species (12-19mm) which has characteristic clubbed antennae. It is a species of dry sunny places on sand, gravels or chalk. There is a single record from 1938 from the Raunds area. It is very possible that the species does still occur in the county especially in sand pits as the mottled grasshopper is relatively common and can be abundant in neighbouring Bedfordshire.

Lesser Earwig (*Labia minor*)

Conservation Status: Local & NRDB

Post 1980 10km squares in VC32: 2

10km squares where not recorded since 1980: 1

Number of pre 1980 records: 1

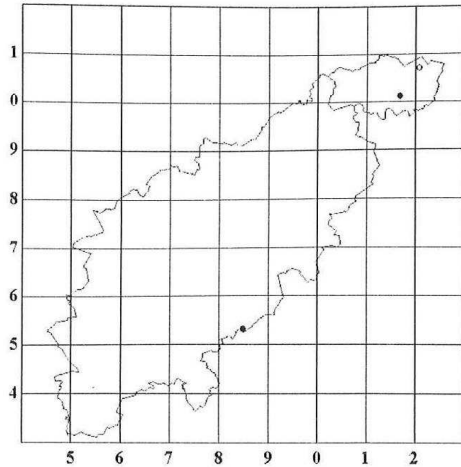
Number of post 1980 records: 3

This is the smallest earwig in Europe reaching only 6mm in extent. It can be mistaken for a small / immature common earwig, but Hawes (1997) gives a clear method of separating the two species. His paper also includes superb colour photograph of a lesser earwig about to fly by Chris Timmins.

There have only ever been four records for this species in the county, the most recent being by Tony Richardson in 1991 from Yardley Chase. The only two other post 1980 records are from the Peterborough area.

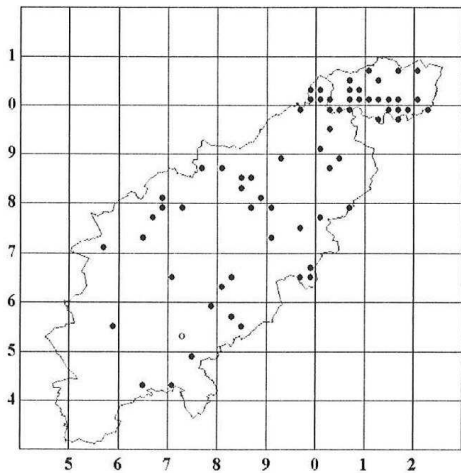
However it is considered that this species is highly under-recorded as it appears to reside in dung heaps in farmyards and stables. Widgery (1997a&b) details to how survey for the species using a trowel which has proved very successful in Gloucestershire where the success rate was nearly 100% with 14 new 10km records being added in 2 weeks. No doubt the species is more widespread in Northamptonshire than current records indicate.

Lesser Earwig



Common Earwig (*Forficula auricularia*)

Common Earwig



Conservation Status: not threatened
Post 1980 10km squares in VC32: 21

10km squares where not recorded since 1980: 0

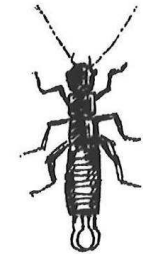
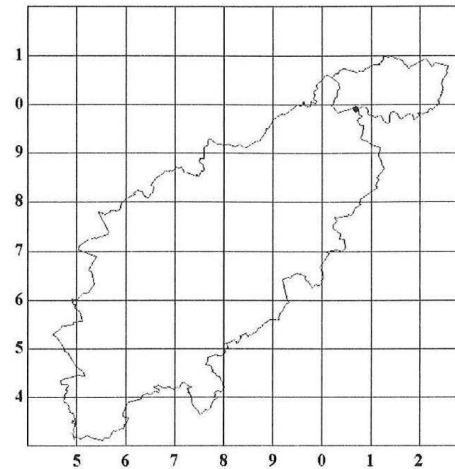
Number of pre 1980 records: 1

Number of post 1980 records: 91

The common earwig is familiar to everyone with its characteristic pincer. It can reach a size of 15mm. It is found in a wide variety of situations including houses, under stones and logs and in rough grassland. Given more thorough surveying the species will no doubt prove to be ubiquitous throughout the county.

Lesne's Earwig (*Forficula lesnei*)

Lesne's Earwig



Conservation Status: Nationally scarce (B) & NRDB

Post 1980 10km squares in VC32: 1

10km squares where not recorded since 1980: 0

Number of pre 1980 records: 0

Number of post 1980 records: 1

Lesne's earwig is a small species (up to 7mm) which can be distinguished from common and lesser earwigs by the absence of hindwings. It is a very elusive species and is best located by beating bushes.

There is a single record for Northamptonshire by Peter Kirby at Old Sulehay Pit in October 1992. It is likely that given more survey work the species will be found to be more common although very local.

Dusky Cockroach (*Ectobius lapponicus*)

Conservation Status: Nationally scarce (B) & NRDB

Post 1980 10km squares in VC32: 1

10km squares where not recorded since 1980: 1

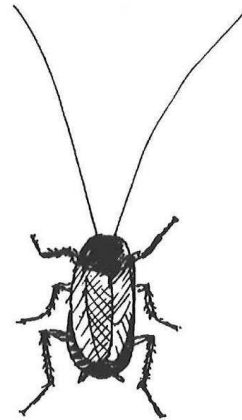
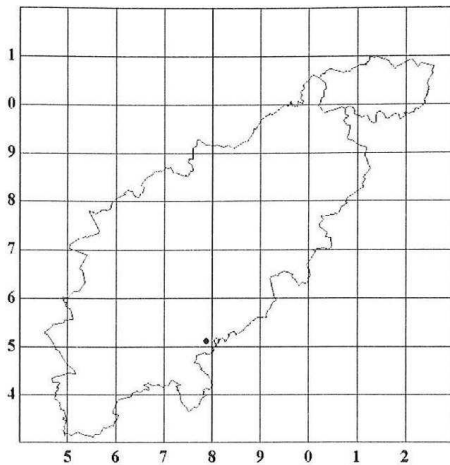
Number of pre 1980 records: 1

Number of post 1980 records: 1

The dusky cockroach is the largest of our native species and can reach 11mm. It is a southern species that appears to favour scrub and coarse vegetation in woodlands.

There are only two records for Northamptonshire – both from Salcey Forest, the first in 1953 and the most recent in 1990 by BS Nau. In Northamptonshire the dusky cockroach appears to be at the limit of its northern distribution.

Dusky Cockroach



Conservation

Table 2 – Conservation Action for the county's orthopteroids

Species of National Importance	
Haes and Harding (1997) after Shirt (1987) and Ball (1986 & 1994)	<p>Cepero's groundhopper Nationally scarce (A) - Protect existing site and search for new sites</p> <p>Roesel's Bush-cricket Nationally scarce (B) - Monitor range expansion</p> <p>Lesne's earwig Nationally scarce (B) - Protect existing site and search for new sites</p> <p>Dusky Cockroach Nationally scarce (B) - Protect existing site and search for new sites</p>
Species of local importance	
Targeted for action in Northamptonshire's Biodiversity Action Plan (Anon 1997)	<p>Common green grasshopper - Protect existing sites and create new wet grasslands</p> <p>Great Green Bush-cricket Nationally local - Protect existing sites</p> <p>Lesser Earwig Nationally local - Protect existing site and search for new sites</p>

It is clear from the Systematic list that a number of species have undergone declines in distribution and others appear to be intrinsically rare and therefore are in need of conservation. The conservation of the county's orthopteroids is fortunately now being addressed as a result of the upsurge in invertebrate conservation initiatives largely resulting from the publication of the UK Biodiversity Action Plan (Anon 1995) and Northamptonshire's local version (Colston et al 1997). Table 2 summarises the species that will hopefully benefit from national and local action. It is proposed that these species form the basis for the revised list of Northamptonshire Red Data Book species.

The future

Table 3 – Comparison of orthopteroids in Cambridgeshire, Huntingdonshire, Northamptonshire & Dorset

County	Native species recorded post 1980	% of national list – 34 species
Old Cambridgeshire VC 29 (Colston 1998b)	20	59%
Huntingdonshire VC 31 (Colston 1998a & in press)	16	47%
Northamptonshire VC 32 (this paper)	17	50%
Dorset VC 9 (Mahon 1992)	31	91%

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

Other species also appear to be undergoing range expansions such as the long-winged cone-head (*Conocephalus discolor*) and the short-winged cone-head (*Conocephalus dorsalis*). The long-winged cone-head is now common in Hertfordshire and (J. Widgery pers comm) and was recorded for the first time in Cambridgeshire in 1998 and in Huntingdonshire in 1999, it is most likely that this species will be recorded in Northamptonshire within the next three years. There are also of course all the obvious gaps still to fill for the common species.

Finally it is useful also to put Northamptonshire into a national perspective. Table 3 compares the orthopteroid faunas of Cambridgeshire, Huntingdonshire, Northamptonshire and Dorset and shows how species number is related to recording effort and latitude. Dorset is a well recorded county which also enjoys a southerly climate, a coastline and a number of rich habitat types. Cambridgeshire, Huntingdonshire, Northamptonshire on the other hand are less well recorded but lack

coastlines, are further north and have lost proportionately more species rich habitat. With additional recording and conservation effort a county such as Northamptonshire might expect some new species (stripe-winged grasshopper, woodland grasshopper, short-winged conehead, long-winged conehead?), but it will never be as species rich as Dorset.

In addition to future records I would be very pleased to receive details of any other published records of orthopteroids in Northamptonshire which I have missed. I would also very much like to receive new records, especially from the south and west of the county.

BRC recording cards (RA4B & GEN7) can be obtained from BRC, Monks Wood Experimental Centre, 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. 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.

Acknowledgements

The following have provided post 1960 records:

KNA Alexander, H Arnold, K Blackwell, J Bratton,, P Cawthorne, MF Claridge, M Clugston, A Colston, G Crawford, B Eversham, JH Flint, WK Ford, DJ Foxwell, C Gerrard, JC Hartley, CH Hendry, I Henshaw, M Jackson, B Jackson, HB Johnston, A Kelham, R Key, P Kirby, SJJ Lambert, NP Meadows, L Moore, BS Nau, N Owens, R Parslow, J Paul, ME Pickles, CW Plant, AJ Prince, DG Rands, B Redman, A Richardson, W Roberts, P Rudkin, MJL Skelton, H Stanier, PC Tinning, D Tozer, P Tuffs, AJ Wake, J Ward, RC Welch, Whellam and P Wilkins without their field work this paper could not have been written.

I would also like to thank John Widgery and Rosemary Parslow for their help and support. The maps included in this paper were produced using Alan Morton's programme DMAP and illustrations were drawn by Rosemary Parslow.

References

- Adkins W.R.D. & Serjenatson R.M. 1902 *Victorian County History – Northamptonshire* RM vol 1 A Constable & Co Ltd, Westminster.
- Anon 1995 *Biodiversity: The UK Steering Group Report vol 2*. H.M.S.O.
- Baldock D.W. 1999 *Grasshoppers and Crickets of Surrey*. Surrey Wildlife Trust.
- Ball S. G. 1986 *Terrestrial and freshwater invertebrates with red Data Book, Notable or habitat indicator status*. Invertebrate Site Register Report no. 66. N.C.C. Peterborough.
- Ball S.G. 1994 *The Invertebrate Site Register – objectives and achievements*. British Journal of Entomology and Natural History 7. Supplement 1:2-14.
- Bellman H. 1985 *A field guide to the grasshoppers and crickets of Britain and Northern Europe*. Collins
- Brown V.K. 1990 *Grasshoppers*. Naturalists Handbook 2. 2nd edition. Richmond Publishing.
- Colston A. Tero C. & Brayshaw S 1997 *Northamptonshire's Biodiversity Action Plan - a framework document*. Northamptonshire Nature Conservation and Landscape Forum

- Colston A. 1998a *Orthopteroids in Huntingdonshire*. Anniversary Review 1948-1998 pp53-65. Huntingdonshire Fauna and Flora Society.
- Colston A. 1998b *A provisional atlas of bush-crickets, grasshoppers and allied insects in old Cambridgeshire*. Nature in Cambridgeshire no. 40 pp 20-36.
- Colston A. 1998c *The range expansion of Metrioptera roeselii in Cambridgeshire and Huntingdonshire*. The Entomologist's Monthly Magazine vol 134 p353.
- Colston A. 1999a *Orthoptera records in Huntingdonshire 1998*. 51st Annual Report of the Huntingdonshire Fauna and Flora Society pp 29-30.
- Colston A. 1999b *Orthoptera Records 1998 in vc 29*. Nature in Cambridgeshire no. 41.
- Colston A. in press *Orthoptera records in Huntingdonshire 1999*. 52nd Annual Report of the Huntingdonshire Fauna and Flora Society
- Colston A. Gerrard C., Jackson M., Moore L. and Tero C. 1996 *Northamptonshire's Red Data Book – species to watch in the county*. The Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire.
- Davies M. 1987 *Grasshoppers, crickets and bush-crickets in Devon*. Nature in Devon 8:45-64. Devon Trust for Nature Conservation.
- Haes E.C.M. & Harding P.T. 1997 *Atlas of grasshoppers, crickets and allied insects in Britain and Ireland*. The Stationery Office.
- Haes E.C.M. 1995 *Wildlife Reports: Grasshoppers and relatives*. British Wildlife 6:253-55
- Hawes C. 1997 *Spotlight on earwigs*. White Admiral 38:5-9. Suffolk Naturalists' Society.
- Mahon A. 1988 *Grasshoppers and bush-crickets*. Shire Natural History.
- Mahon A. 1992 *The Distribution of orthoptera in Dorset*. Recording Dorset 2:2-9.
- Marshall J.A. & Haes E.C.M. 1988 *Grasshoppers and Allied Insects of Great Britain and Ireland*. Harley.
- Paul J. 1989 *Grasshoppers and crickets of Berkshire, Buckinghamshire and Oxfordshire*. Pisces.
- Rackham O 1986 *The History of the Countryside*. Dent
- Ragge D.R. & Reynolds W.J. 1998 *The songs of the grasshoppers and crickets of Western Europe*. Book and CD. Harley.
- Ragge D.R. 1965 *Grasshoppers, crickets and cockroaches of the British Isles*. Warne.
- Ragge D.R. 1988 *A sound guide to the Grasshoppers and Allied Insects of Great Britain and Ireland*. Harley.
- Rands D.G. 1977 *The Distribution of the common bush-crickets and grasshoppers in Bedfordshire*. Journal of the Bedfordshire Natural History Society 32:25-30.
- Rands D.G. 1991 *Lesser marsh grasshopper*. Bedfordshire Naturalist 45:31-33.
- Richmond D.I. & Irwin A.G. 1991 *The grasshoppers and crickets of Norfolk*. Transactions of the Norfolk & Norwich Naturalists' Society 29:53-70.
- Richmond D.I. 1994 *On the changing status of Norfolk Orthoptera*. Transactions of the Norfolk and Norwich Naturalist's' Society vol. 30:25-32.
- Sharpe K.M. 1995 *Grasshoppers and crickets - Report of the Recorder*. Bedfordshire Naturalist 49:44-48.
- Skelton M.J. 1974 *Preliminary distribution maps: Orthoptera, Dictyoptera and Odonata*. Biological Records Centre, Monks Wood.
- Sterry P. 1990 *Identification – British grasshoppers*. British Wildlife 1:219-223
- Sterry P. 1991 *Identification – British bush-crickets*. British Wildlife 2:233-237
- Wake A. 1997 *Grasshoppers and crickets of Essex*. Colchester Natural History Society.
- Widgery J. P. 1996a *Wildlife Reports: Grasshoppers and relatives*. British Wildlife 7:322.

Widgery J. P. 1996b *Wildlife Reports: Grasshoppers and relatives*. British Wildlife 8:49-51.
Widgery J. P. 1997a *Wildlife Reports: Grasshoppers and relatives*. British Wildlife 8:321
Widgery J. P. 1997b *Wildlife Reports: Grasshoppers and relatives*. British Wildlife 9:51.

Adrian Colston is Property Manager at Wicken Fen National Nature Reserve. Before taking up that post in 1997 he spent 12 years with the Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire. He is Vice County Recorder for Orthopteroids

WILDLIFE OF *Northamptonshire* AND THE SOKE OF PETERBOROUGH



Number 1 Summer 2000

Pitsford Water Nature Reserve
Dreaming of Biodiversity
Bush Crickets, Grasshoppers and Allied Insects
The Water Vole
Orchids of Whitewater Marsh
Breeding Waders
The Sycamore
Maritime Plants in Northamptonshire
Northamptonshire's Flora