

**LEICESTERSHIRE
ENTOMOLOGICAL SOCIETY**

**The Orthoptera of
Rutland**

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Habitat of the Short-winged Conehead at Lyndon reserve, Rutland Water

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Foreword – Richard Brown (18 December 2019)

Rutland's county motto is *Multum in Parvo*. For any naturalist, Rutland indeed offers a small area to work in, it has less than one-tenth of the area of neighbouring Lincolnshire and is even smaller than the Isle of Wight (when the tide is out). Rutland's natural habitats are also limited as it is land-locked and has no significant range of hills. However, this publication shows that *multum* can overcome the *parvo* handicap given a persistent and observant set of naturalists. Phil Rudkin here illuminates the local history of the study of Orthoptera from the early *ad hoc* observations of individuals, through the advent of the more systematic use of bat detectors by the Rutland Natural History Society, to the expectant local searching when records from neighbouring counties show the arrival of new species on Rutland's borders. A pride of place is given to the stimulus afforded by the development of wetland habitat at Rutland Water. Altogether, not only is the present day picture of the Rutland Orthoptera given, it indicates where and how the next generation of naturalists can expand the local knowledge of these fascinating insects.

What are Orthoptera?

Table 1: British Native Orthoptera

| | |
|---|---|
| Ensifera: Crickets | <i>Meconema thalassinum</i> (Oak Bush-cricket) |
| | <i>Tettigonia viridissima</i> (Great Green Bush-cricket) |
| | <i>Decticus verrucivorus</i> (Wartybiter) |
| | <i>Pholidoptera griseoptera</i> (Dark Bush-cricket) |
| | <i>Platycleis albopunctata</i> (Grey Bush-cricket) |
| | <i>Metrioptera brachyptera</i> (Bog Bush-cricket) |
| | <i>Metrioptera (= Roeseliana) roeselii</i> (Roesel's Bush-cricket) |
| | <i>Conocephalus fuscus (= discolor)</i> (Long-winged Conehead) |
| | <i>Conocephalus dorsalis</i> (Short-winged Conehead) |
| | <i>Leptophyes punctatissima</i> (Speckled Bush-cricket) |
| | <i>Gryllus campestris</i> (Field Cricket) |
| | <i>Nemobius sylvestris</i> (Wood Cricket) |
| | <i>Pseudogoplistes vicentae</i> (Scaly Cricket) |
| | <i>Gryllotalpa gryllotalpa</i> (Mole Cricket) |
| Caelifera: Groundhoppers & Grasshopper) | <i>Tetrix ceperoi</i> (Cepero's Groundhopper) |
| | <i>Tetrix subulata</i> (Slender Groundhopper) |
| | <i>Tetrix undulata</i> (Common Groundhopper) |
| | <i>Stethophyma grossum</i> (Large Marsh Grsshopper) |
| | <i>Stenobothrus lineatus</i> (Striped-winged Grasshopper) |
| | <i>Stenobothrus stigmaticus</i> (Lesser Mottled Grasshopper) |
| | <i>Omocestus rufipes</i> (Woodland Grasshopper) |
| | <i>Omocestus viridulus</i> (Common Green Grasshopper) |
| | <i>Chorthippus brunneus</i> (Field Grasshopper) |
| | <i>Chorthippus vagans</i> (Heath Grasshopper) |
| | <i>Chorthippus parallelus</i> (Meadow Grasshopper) |
| | <i>Chorthippus albomarginatus</i> (Lesser Marsh Grasshopper) |
| | <i>Gomphocerippus rufus</i> (Rufous Grasshopper) |
| <i>Myrmeleotettix maculatus</i> (Mottled Grasshopper) | |

Orthoptera are an order of insects that encompasses the sub-order Caelifera (grasshoppers, locusts and close-relatives) and the sub-order Ensifera (crickets and close relatives). They are characterised by a generally cylindrical body, large eyes, elongated hind legs adapted for jumping and mouthparts that are adapted for biting and chewing. They have two pairs of wings the forewings are narrower and more hardened than the hind membranous pair. These latter, with straight and cross veins, are folded fan-like under the fore wings when at rest. The end of the abdomen is modified to a single-segmented cercus. The Orthoptera show an incomplete metamorphosis and the males, in particular, produce sound (stridulating). More information on the biology of these insects can be found at the Orthopteran Recording site (orthoptera.org.uk).

There are more than 20,000 species worldwide although in the United Kingdom this is drastically reduced to only 28 native species with occasional migrants. The current list is shown in Table 1 with those recorded in Rutland in **bold**. The occurrence of Orthoptera in neighbouring Leicestershire was recently reported by Ikin (2018). Table 2 lists other Orthoptera that have occasionally turned up in Britain and been variously designated as British Non-native (BN), Occasional Introductions (IN), Occasional Migrant (MI) or Channel Islands Native (CI) by the National Recording Scheme. Again, those that have been recorded in Rutland at one time or another are indicated in **bold**.

Table 2: Non-native Orthoptera

| | |
|---|---|
| Superfamily: Tettigionidae: Crickets | <i>Tachycines asynamorus</i> (Greenhouse Camel Cricket) - NN |
| | <i>Chopardina importata</i> – N |
| | <i>Cosmoderus maculatus</i> (Prickly Bush-cricket) - IN |
| | <i>Jamaicana flava</i> - IN |
| | <i>Jamaicana subguttata</i> - IN |
| | <i>Mastophyllum scabricolle</i> (Brown-winged Bush-cricket) – IN |
| | <i>Nesonotus tricornis</i> - IN |
| | <i>Meconema meridionale</i> (Southern Oak Bush-cricket) - NN |
| | <i>Ruspolia nitidula</i> (Large Conehead) - MI |
| | <i>Phlugiolopsis henryi</i> (Tropical Bush-cricket) - IN |
| | <i>Phaneroptera falcata</i> (Sickle-bearing Bush-cricket) - NN |
| | <i>Acheta domesticus</i> (House Cricket) - NN |
| | <i>Gryllus bimaculatus</i> (Southern Field Cricket) – IN |
| | <i>Grylodes supplicans</i> Tropical House Cricket) - IN |
| Superfamily: Caelifera: Groundhoppers & Grasshopper) | <i>Anacridium aegyptium</i> (Egyptian Grasshopper) – IN |
| | <i>Schistocerca gregaria</i> (Desert Locust) - MI |
| | <i>Calliptamus italicus</i> (Italian Locust) - MI |
| | <i>Oedipoda caerulescens</i> (Blue-winged Grasshopper) – CI |
| | <i>Locusta migratoria</i> (Migratory Locust) - MI |
| | <i>Euchorthippus elegantulus</i> (Jersey Grasshopper) - CI |

Some of these have turned up on very rare occasions in Rutland including the Migratory Locust. Whilst not from Rutland other locusts seemed to have appeared in neighbouring Leicestershire in the 19th century (Plant, 1846; Morris, 2019) indicating that there was a likelihood that these could easily have been in Rutland although unnoticed. A recent overview of British Orthoptera appeared in 2017 (Sutton *et al*, 2017).

Historical aspects of recording in Rutland

Probably the earliest Rutland record of an orthopteran was the Migratory Locust at Preston in 1846 (Turner, 1846). The Rutland volume of the Victoria County History (Douglas, 1908) listed only two species – *Gomophocerus maculatus* (now *Myrmeleotetrix maculatus*) and *Locusta viridissima* (now *Tettigonia viridissima*) but with no details - there is no reference to the earlier Migratory Locust record. For most of the 20th century, the recording of crickets and grasshoppers in Rutland was sporadic with occasional reports appearing in natural history and entomological publications. Examples are the Common Green Grasshopper and the Field Grasshopper being common in the Uppingham district (Payne, 1946). However, in more recent times occasional reports have appeared in local publications including the Leicestershire Entomological Society Newsletter, the Journal of the Derbyshire & Nottinghamshire Entomological Society, the Leicestershire & Rutland Recorder and the Newsletter of the Grasshopper and Related Species Recording Scheme of Britain and Ireland (www.orthoptera.org.uk). Since about 2007 regular reports have appeared in the Rutland Natural History Society's Newsletter, *Fieldfare*, with reviews in their Annual Report.

Modern-day recording in Rutland

In 2011, I received a most valuable and important document regarding the Orthoptera in Rutland. Kindly sent to me from Bjorn Beckmann, of the National Orthoptera Recording Scheme, was a mammoth spreadsheet for VC55, which contained two historical records of the grasshoppers and crickets found in Rutland. The Field Grasshopper was recorded at the Eye Brook Reservoir (05/09/1960) while the Slender Groundhopper was recorded at Ketton Quarry (02/06/1962). In 1989 Leicester Museum Services published *Burley Wood: report on a study of its history and ecology* (Evans, 1989). This included casual records of the orthopterans in the wood including Dark Bush Cricket first recorded at the southern edge of the wood in 1977 by Dr JC Hartley who commented that the insect was "frequently recorded on the edges of rides; and apparently widespread in the wood" where he also discovered Speckled Bush Cricket. Steve Grover recorded Common Green Grasshopper 07/08/1989 with Common Field Grasshopper being found by Michael Jeeves 30/08/1989.

The Rutland Natural History Society was formed in the spring of 1965. In the early years recording concentrated on birds and botany. By the early 1970s, an Entomological section was formed with Monty Tyler as Recorder. Lepidoptera (moths in particular) was the main group studied and recorded with only the odd orthopteran sightings appearing in the RNHS newsletter *Fieldfare* (early 1970s-1980s). In 1988, Jean and Ron Harvey took over the Entomological post as Recorders. From this date, a few more regular orthopteran reports were received and published (along with other insects).



Figure 1: The author getting down to it!

In spring 2001, I became Orthoptera Recorder (Figure 1 right) for the Rutland Water Nature Reserves. I accepted the position with the condition that my records would be included in the RNHS data bank. It was from this point that the Rutland grasshoppers and bush crickets were regularly reported. Following reorganisation of recording within the RNHS (2006) I became County Orthoptera Recorder for Rutland (2007). This was the most important time for the Rutland Orthoptera as a single group and for its future rationalization.

The occurrence of orthoptera in Rutland is influenced by the habitats and landscapes within its border and how this is influenced by the underlying geology (Appendix 1) whilst Appendix 2 lists the sites where the insects have been recorded indicating almost total cover of the county.

Bat-detectors and the songs of the orthopterans

The use of bat-detectors is essential for orthopteran survey work as each species produces its own distinctive song allowing the listener to identify the species (Figure 2). This allows a larger area to be covered in a short time. This involves tuning in to the correct frequency. My years of studying bird song made it satisfying to be able to separate the stridulating of Long-winged and Short-winged Coneheads

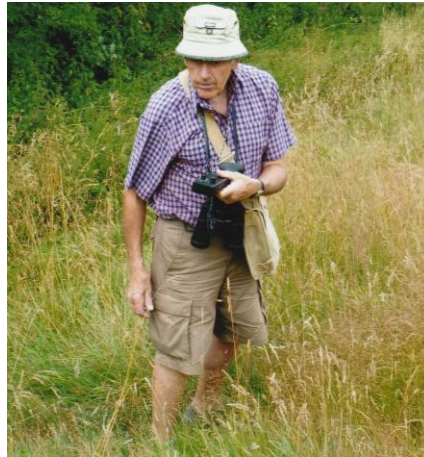


Figure 2: The author listening in!

I purchased my first Bat-Detector (Stag Electronics BATBOX 111) in September 1999, these machines being recommended for Orthoptera work at this time. It was invaluable in the following years. Eventually, technology improved, and more scientific machines were coming onto the market. However, for my purposes, (and other naturalists), the Stag Electronics BATBOX 111 was succeeded by the MAGENTA Bat5, Digital Precision which I purchased in October 2012. These basic machines are very good value being great for bat work and for orthopteran surveys. However, how can bat-detectors be used to pick up the songs of the orthopterans? Baldock (1999) states that the detectors are modified to pick up the grasshopper sounds.

Over the years, I have noted that the machines do vary. Accordingly, the wonderful lists of frequencies for orthopterans, presented at least by three authors, are very interesting. However, I find that I can pick up most of the orthoptera at between 17-21 kHz. The exception is the Speckled Bush Cricket which I get at 35 kHz. Other detector-users find that 45 kHz is the optimum. Finally I have a useful tip: when facing the hundreds of very noisy Roesel's Bush Crickets (at 21 kHz) in order to check that there are Long-winged Coneheads in with them, I turn up the frequency to about 36 kHz which overrides the "noisy neighbours " and one can listen in to the Long-winged Coneheads in peace!

Mapping Rutland's Grasshoppers and Crickets

Having amassed a large amount of data for the Orthoptera in Rutland, (including a scattering of historical and casual reports prior to 1965), it was decided that it was time to provide provisional distribution maps for the grasshoppers and crickets in Rutland which Paul Willoughby-Ellis has updated to 2020 for this publication.

In August 2011 negotiations were set in motion with Gareth Price, the then Community Support Ecologist at the Leicestershire & Rutland Environmental Records Centre (LRERC), kindly producing the first provisional distribution maps with records up to 2010. As a result of this, it was noted that there was a dearth of reports from the north of Rutland. This was corrected with visits to fill in these gaps. The making of these maps provided another piece of history for the RNHS as these were the first-ever provisional maps published for the orthopterans in Rutland. In December 2012, with many more tetrads covered, it was decided to update the provisional 2010 distribution maps. This time the maps were produced by Elaine Connor at LRERC with records up to 2011.

In 2016, Paul Willoughby-Ellis and Richard Brown up-dated the distribution maps in draft form. Paul filled in a few more new sites and up-graded them to the end of the 2017 season. The completed *Distribution Maps for the Orthoptera of Rutland* was published in the RNHS Annual Report for 2017, the first ever for the society! The maps have been sent to the National Orthoptera Recording Scheme organisers, at the Centre for Ecology and Hydrology, Wallingford Oxfordshire. Figure 3 summarises the number of species recorded in each Rutland tetrad as of the end of 2020 and Appendix 2 lists the sites covered in the recording effort.

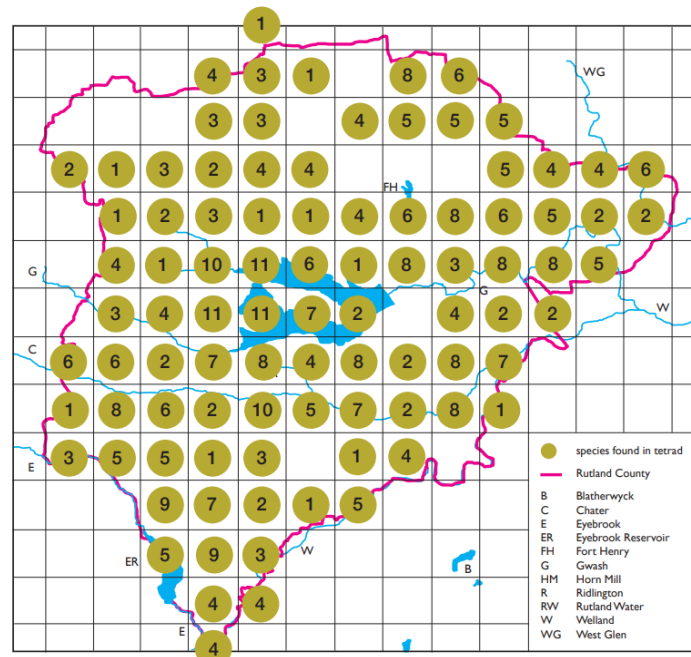


Figure 3: Number of species identified from each Rutland tetrad to 2020

Recent Rutland colonisers

Up to September 1997, Rutland had nine recorded orthopteran species: four Crickets (Oak Bush, Dark Bush, Speckled Bush and House) two Groundhoppers (Slender and Common) and three Grasshoppers (Common Green, Field and Meadow).

The first new Orthopteran to appear in Rutland was the Lesser Marsh Grasshopper when it was recorded at the Woodland Trust's Gorsefield site at Oakham (07/09/1977) by Dr Clive Jones and the author. It then spread phenomenally all over Rutland in suitable habitats. The second to appear was Roesel's Bush Cricket; this beautiful species was discovered in grasses by John Wright on the track to Fieldfare Hide at Rutland Water NR (01/08/2001). It was not recorded the following year but by 2003 it was found on the Lyndon and Egleton reserves as well as on the northern shore of Eye Brook Reservoir. It then swiftly colonised almost every habitat in Rutland, often in enormous numbers, with many of the macropterous forms being reported every year up to 2016.

The Long-winged Conehead was first recorded 15/08/2003 by Derbyshire orthopterist, Roy Frost, who discovered a pair in the same rough grasses near Fieldfare hide (Rutland Water NR) where Roesel's Cricket had been found in 2001. It then spread rapidly over the years into suitable habitats (often in association with Roesel's) with macropterous forms found annually. It was not until 2007 before the consistent scraping sound of the Short-winged Conehead was heard on 13/09/2007 on the Hambleton peninsular. A year later stridulating Short-winged Coneheads were heard from a large patch of *Juncus* with both females and males being captured. This species is an enigma in Rutland! In July 2010 the species had successfully colonised suitable damp habitat at Egleton, and then at Lyndon in July 2015 again amongst *Juncus*; a colony was discovered at Caldecott on 28th September, currently the only site off the Rutland Water NR complex.

Appendix 3 included some vignettes of the discovery of these species produced at the time.

Acknowledgments

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 Charles Gallimore, Norman Gordon, Martin Grimes
 D Hall, Jenny Harris, Jean Harvey, Ronald Harvey
 Helen Ikin
 Clive Jones
 Rafial Kear, Samuel Kear
 Alistair Lawrence, Derek Lee, Frances Lee, Roy Lemmon
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In addition my thanks go to the following for access to their records: Bjorn Beckman, Centre for Ecology & Hydrology; Loughborough Naturalists Club; Rutland Natural History Society; Luffenham Heath Golf Club SSSI; Leicestershire & Rutland Wildlife Trust, Rutland Water.

Particular thanks go to Paul Willoughby-Ellis, Richard Brown for the production of the current distribution maps presented here and to Ray Morris for the historical aspects of Rutland's Orthoptera.

Selected bibliography of publications of Orthoptera in Rutland

RNHS – Rutland Natural History Society

LES – Leicestershire Entomological Society

DANES - Derbyshire & Nottinghamshire Entomological Society

LRR – Leicestershire & Rutland Recorder

NRS – National Recording Scheme

VCHR – Victoria County History Rutland

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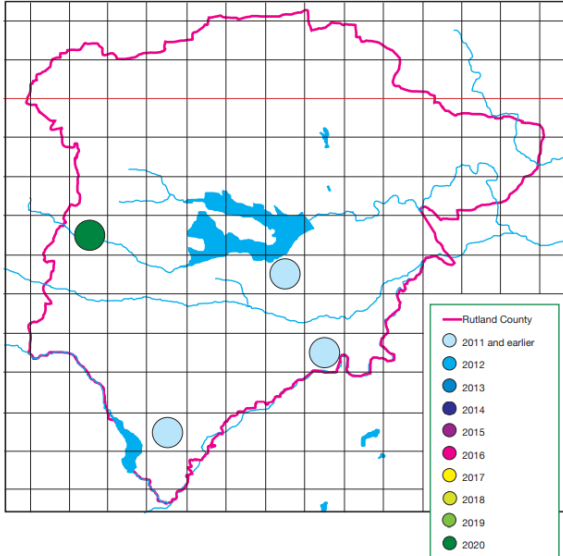
Useful publication: Baldock, D (1999). *Grasshoppers and Crickets of Surrey*. Surrey Wildlife Trust.

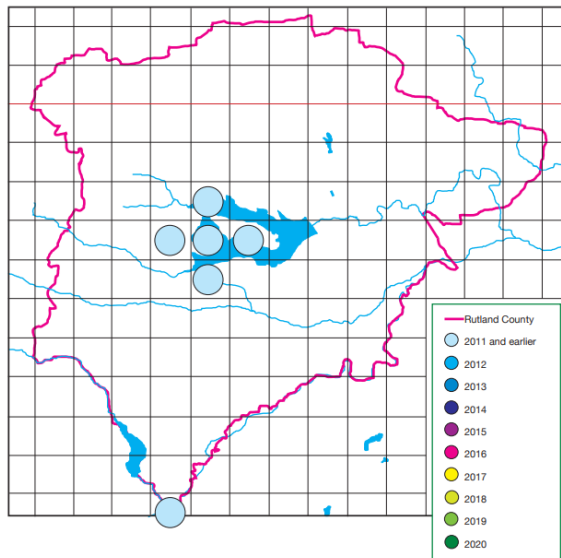
Although not listed here, it should be recognised that, as Rutland County Recorder, the orthoptera have been regularly reported by the author on a regular basis in the RNHS *Fieldfare* Newsletter and also in the RNHS *Annual Report*.

Rutland orthoptera

Each entry includes notes on the British distribution of the species based on maps produced by the NBN Atlas (accessed March 2021), some indication of the habitat(s) where the insect may be found and comments on Rutland occurrence. Accompanying each entry is a map of current (2020) distribution in the county and, where available, images of the species.

Crickets

| <i>Acheta domesticus</i> | House Cricket |
|---|---|
|  | <p><u>British status:</u> present in much of England being scattered elsewhere.</p> <p><u>Habitat:</u> seems to prefer the vicinity of human habitation.</p> <p><u>Rutland records:</u> the distribution map shows four locations in Rutland three of which are historical occasional reports. However, one recent report was of a male found stridulating on a balcony at Braunston in Rutland, on 24 August 2020. This true cricket, of the Gryllidae family, is now widely regarded as not wild and is probably an escapee from pet shops.</p> |

Conocephalus dorsalis**Short-winged Conehead**

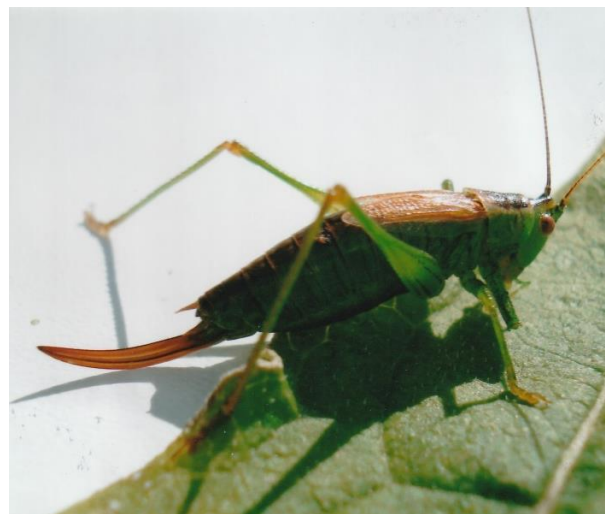
British status: a mainly coastal species but spreading inland in England to suitable habitats.

Habitat: common in wet meadows and slow-flowing streams with floating plants, lowland peatlands, reed beds.

Rutland records: majority of records come from the Rutland Water complex apart from one large colony at Caldicott, south Rutland found on 28/09/2011. The species first appeared in the county on 13/09/2007 when a small colony was located in a wet grassy verge on the Hambleton peninsular road. In October 2008 a large colony was discovered in a patch of *Juncus* on the Hambleton North Arm 1 south shore. In July 2010 the species made the short journey to the Egleton reserve and by August three more colonies were reported with continued increase in colonies over following years. A small pioneering colony was at Lyndon (July 2015) again in *Juncus*.



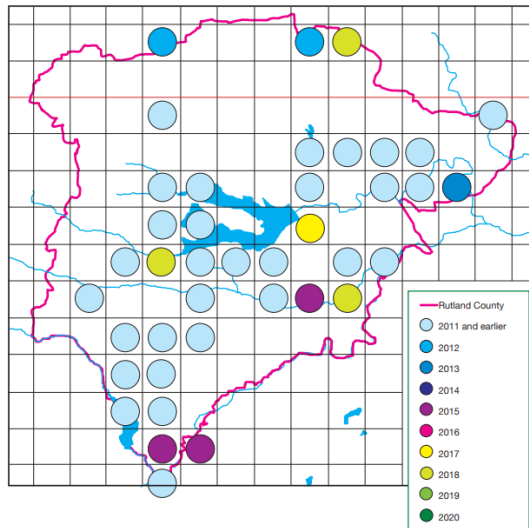
Henry Stannier



Conocephalus fuscus**Long-winged Conehead**

British status: common and widespread from the Humber to the Bristol Channel.

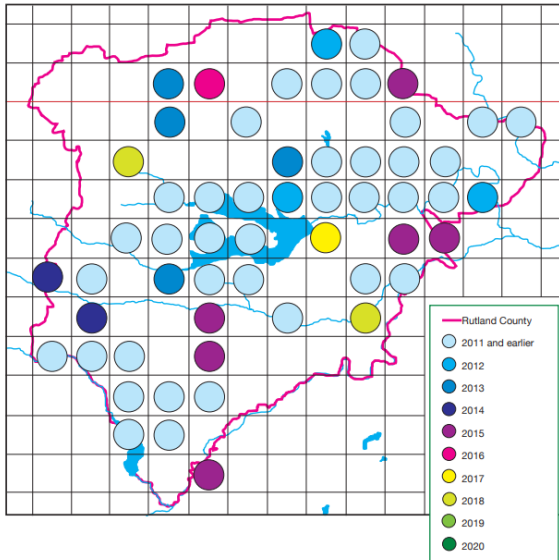
Habitat: similar to that of the Roesel's Bush Cricket including coarse, dry and damp grasslands, roadside verges, waste ground, and at the edges of arable crops.



Rutland records: A successful coloniser first appearing in Rutland 15/08/2003 at the Egleton reserve. This lovely green (sometimes brown) bush cricket did not spread as rapidly as Roesel's being slower in reaching the high numbers of the latter. Nevertheless, the distribution maps show a widespread picture in Rutland, particularly at both Rutland Water nature reserves. It was found in long rank-verge grasses near Fieldfare hide South Arm 1 in the same area as the Roesel's Bush Cricket first appearance in 2001. Stridulation reminds one of a 'chugging' tractor. When surveying an area of rough grasses, where Roesel's and the coneheads are all stridulating, and using the bat-detector at 20 kHz, the former drowns out the latter's song. To listen out for the Long-winged Conehead, it is useful to turn up to about 26 kHz. This over-rides the loud 'sizzling' song of the Roesel's Bush Cricket.



Macropterus female

Leptophyes punctatissima**Speckled Bush-cricket**

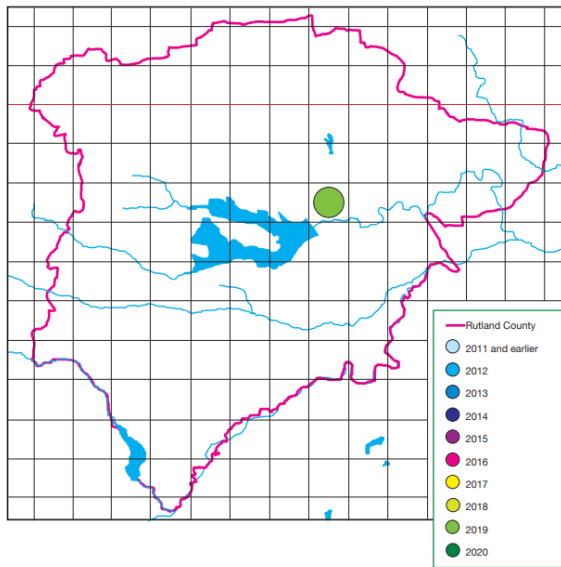
British status: common and widespread in England, scattered elsewhere.

Habitat: open woodland, hedgerows, scrub, garden centres private gardens with shrubs and trees.

Rutland records: Until the extended use of bat detectors for survey work from 1998, this beautiful green and speckled cricket was regarded as uncommon. The detectors are essential for the location of this flightless bush-cricket set at 35-40kHz. Large colonies exist in woodland, scrub, hedgerows and particularly in the trees and shrubs in garden centres. It is now one of the most numerous orthopteran species in the county. The insect is flightless with tiny wings so stridulating can only be heard by using bat detectors. This comes over as a series of short clicks. Mainly heard high in trees and, occasionally, lower down in shrubs.



| <i>Meconema meridionale</i> | Southern Oak Bush Cricket |
|------------------------------------|----------------------------------|
|------------------------------------|----------------------------------|

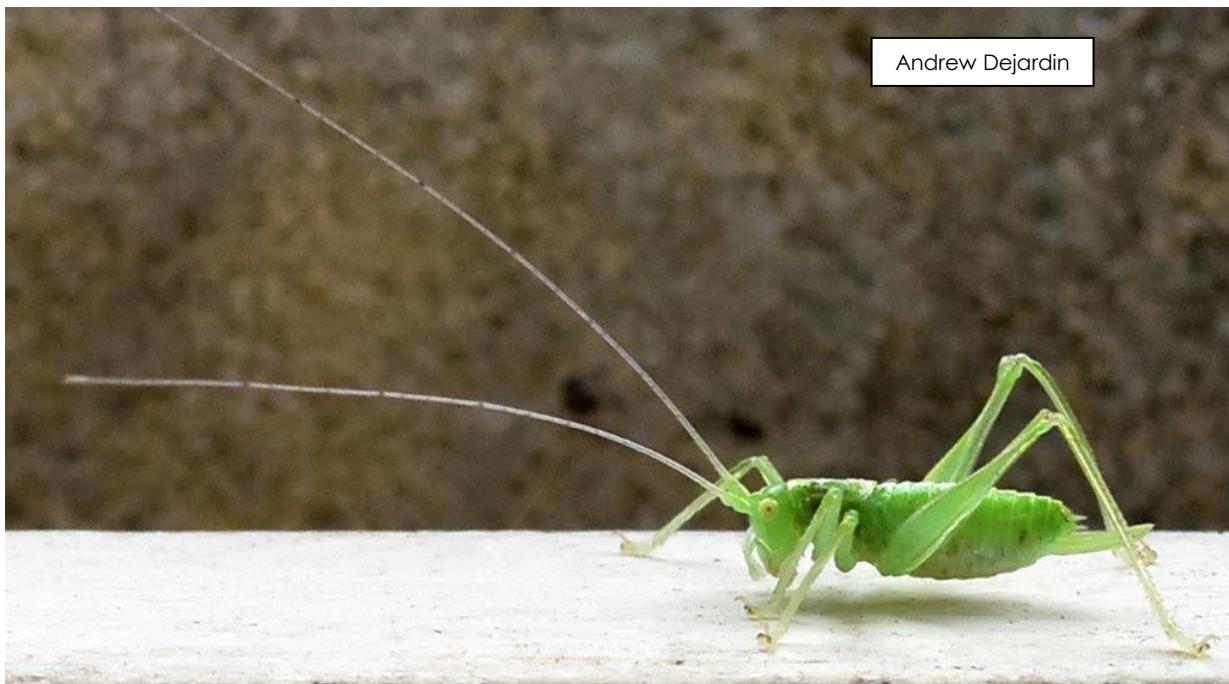


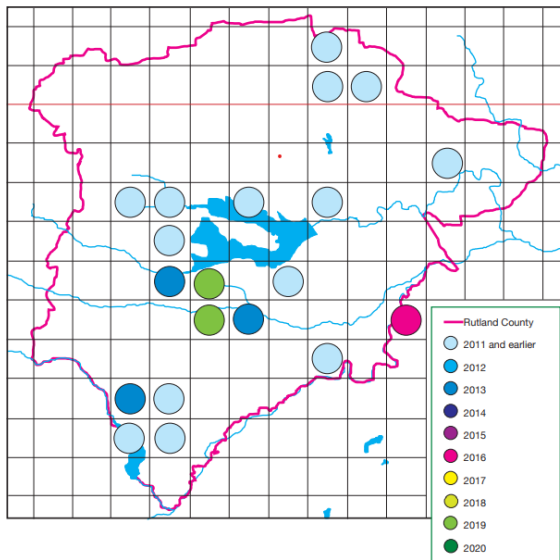
British status: mainly SE England and scattered elsewhere.

Habitat: wooded grasslands, individual trees in the landscape or in parks and gardens, hedge areas with single trees, woodland edges, scrub and similar places.

Rutland records: first discovered in Rutland on 23/09/2017 when both males and females were seen by Andrew Dejardin on garden and house walls of a shop in Empingham. It was subsequently seen at the same location on the 03/08/2019 and 24/10/2019.

[The cricket was also noted in 2017 at Shepshed in Leicestershire.]

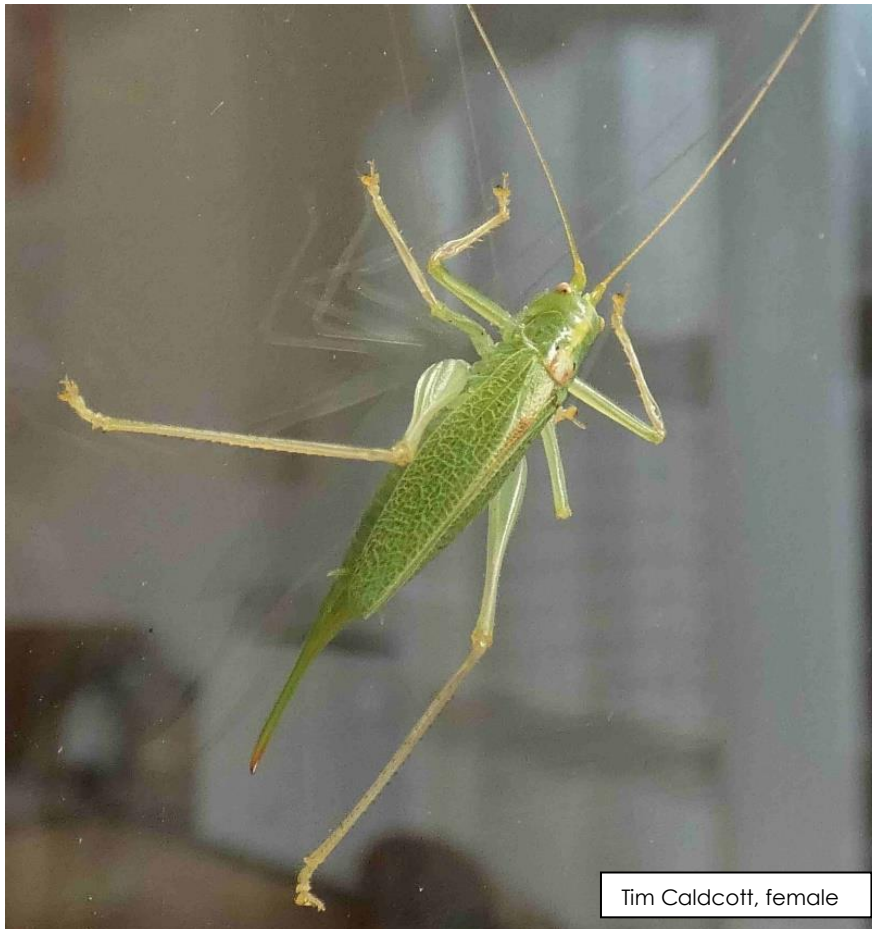


Meconema thalassinum**Oak Bush Cricket**

British status: common through most of England and Wales.

Habitat: a wide range of broad-leaved trees, in woodland, gardens and hedgerows.

Rutland records: may be under-recorded possibly because the cricket does not stridulate. It does attempt to drum with its legs on leaves but this is rarely discernible. Also it spends almost its entire existence in the foliage of tall trees (of many types), and is nocturnal. The majority of reports are of dead specimens found on minor roads, under tree-lined avenues, and in gardens with tall deciduous trees. This is thought to be due to high winds, causing the crickets to be blown out of the foliage. It readily comes to lights, at open well-lit bed-room windows and can sometimes be found in moth-traps.



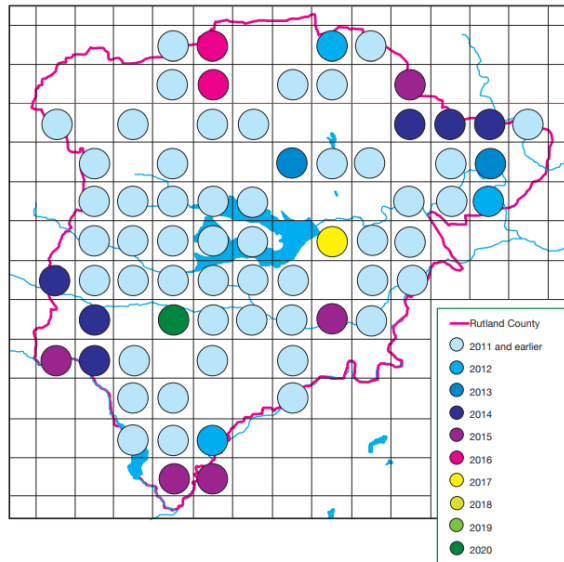
Tim Caldcott, female

Metrioptera (= Roeseliana) roselii**Roesel's Bush-cricket**

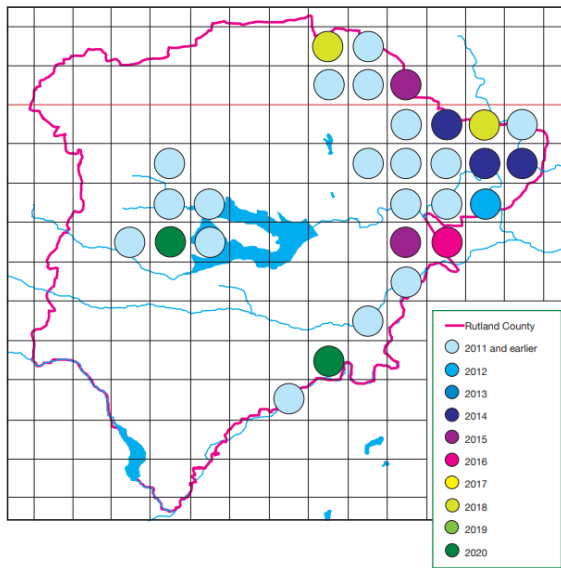
British status: England south from Humber to Bristol Channel.

Habitat: any tall grasses/nettles in farm fields, quarries, hayfields, nature reserves, conservation headlands – the rougher the better.

Rutland records: this attractive and colourful insect is a very successful coloniser. It first appeared in Rutland 01/08/2001 at Egleton. In 2003 the real expansion began and today this species is widespread in every conceivable habitat. How do they spread so quickly and set up new colonies? In response to over-crowding, some individuals of both sexes develop extra-long wings i.e. become macropterus. Eventually, usually on a hot day, this form will take off and fly to pastures new and set up colonies elsewhere. This phenomenon is well-documented and has been witnessed by the Rutland survey team including the author. Stridulating is remarkable – a loud constant high-pitched buzzing, with no deviation, sounding like electric power lines. The colonies are very large and crowded - listening with a bat detector to masses of males is quite remarkable often being so loud that it masks the stridulating by other orthopterans,



| | |
|---|--------------------------|
| <i>Pholidoptera griseoaptera</i> | Dark Bush-cricket |
|---|--------------------------|



British status: common in southern Britain.

Habitat: bramble thickets, scrub, hedgerows, woodland rides/glades nettle beds and ditches.

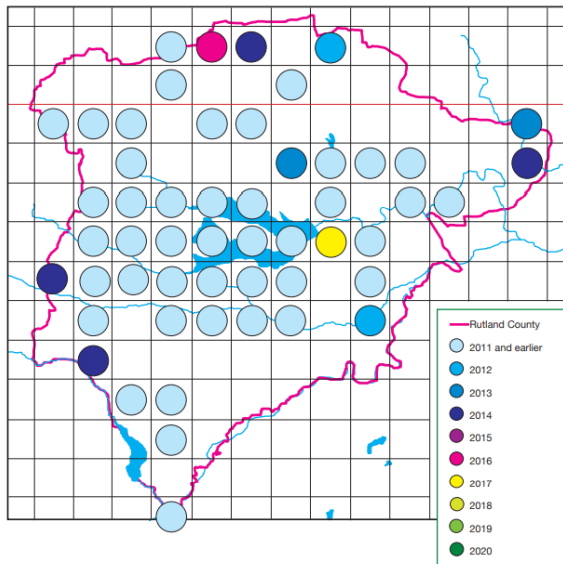
Rutland records: as this species does not fly, this results in the cricket expanding very slowly and not far. However where they exist, they are constant being easily observed during the day sunning themselves on leaves of shrubs, particularly bramble. Stridulating can be heard day or night, with brisk, short chirps, usually from low vegetation. Much more interesting, is when males gather together and form a chorus of sound.



Grasshoppers and Groundhoppers

Chorthippus albomarginatus

Lesser Marsh Grasshopper

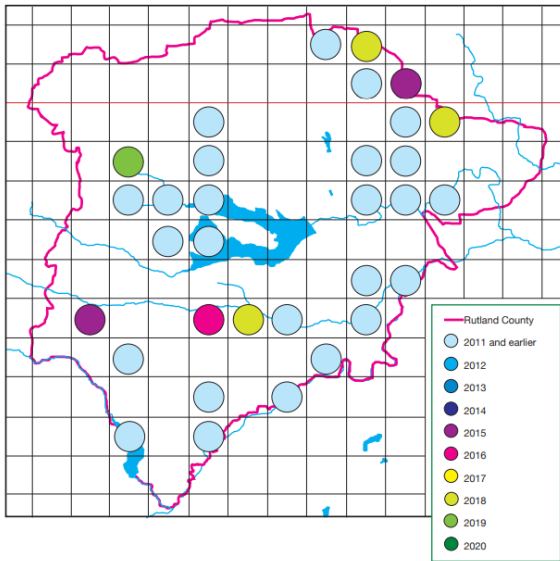


British status: common south of the Humber and Bristol Channel.

Habitat: long, rank grasses in meadows and pastures, and marshy margins. In rough grasses/herbage, in odd corners of farm-fields, grassy hillsides, and roadside verges.

Rutland records: very successful and the first coloniser from the south-east coast to reach Rutland in modern times. First discovered in Rutland 07/09/1997 by the author at Gorsefield, Oakham then spreading rapidly into all habitats in Rutland. It is tricky to identify in the hand: females are larger than males with both fully-winged. However, females have a conspicuous white stripe along the lower-edge of the wings and also a costal bulge. The species is fully at home in rank grassland with Roesel's and Meadow Grasshoppers. Stridulating is short, sharp rapid clicks. This is the only grasshopper in Rutland that has a remarkable courtship song of a series of drawn-out phrases that slope upwards then comes sharply to a loud climax which is a clincher for survey workers as an assessment of breeding with pairs easily observed, in the grass.

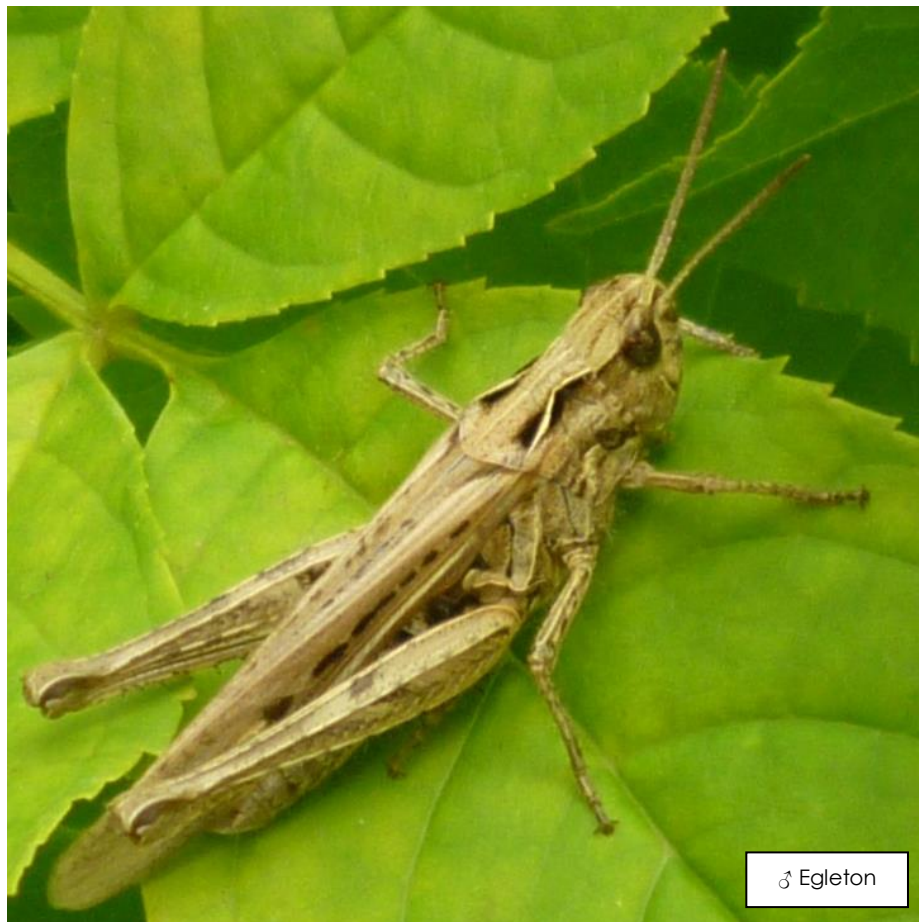


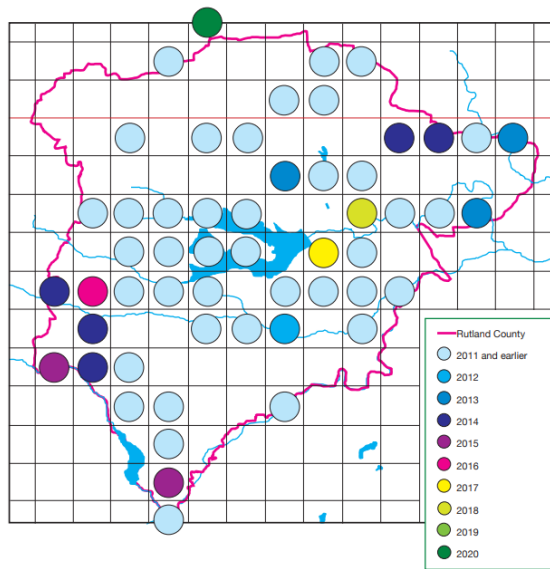
Chorthippus brunneus**Field Grasshopper**

British status: common throughout England and Wales, less so in Scotland.

Habitat: most often found in small, loose colonies on patches of bare earth and amongst short vegetation. Also in bare patches on roadside verges and allotments.

Rutland records: a very good flyer with a quiet stridulating making it necessary to catch to identify. This grasshopper is the master of disguise as its colour matches its surroundings. The colour matching is determined in an early instar which then stays with the insect for the rest of the season. It is our only grasshopper to have a dense, hairy underside on the thorax. Favourite sites include Quarry Farm (near Stamford), Luffenham Heath Golf Club SSSI and Ketton Quarries. The quiet song is not very attractive being two brief chirps a second.



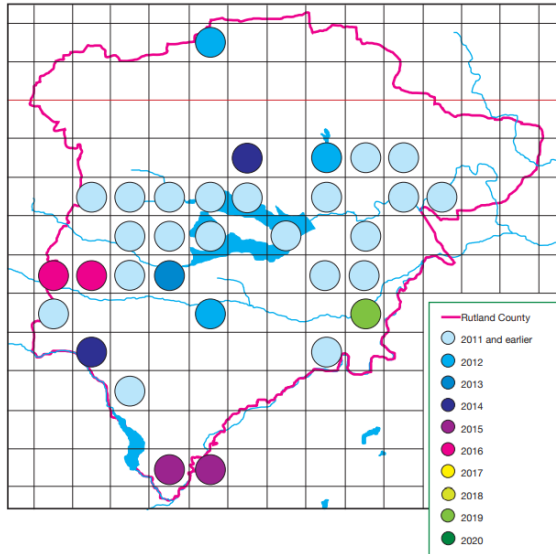
Chorthippus* (= *Pseudochorthippus*) *parallelus**Meadow Grasshopper**

British status: common throughout.

Habitat: grasslands of all sorts, particularly ungrazed and rough, dampish pasture, as well as long rank marshy meadows.

Rutland records: its song is the background sound in our meadows and rough pasture consisting of regular phrases of rapid bursts for 1-3 seconds. When captured for identification it is not difficult as the female has a long body with short wings and is larger than the fully-winged male. Colour variations are quite extraordinary. Purple forms are common in habitats where dark blue wildflowers dominate. Favoured Rutland sites include Horn Mill, Exton, and Rutland Water North Arm meadows as well as Egleton and Lyndon reserves where conservation meadows are abundant. Also at Wing Burrows and Wing village allotments.



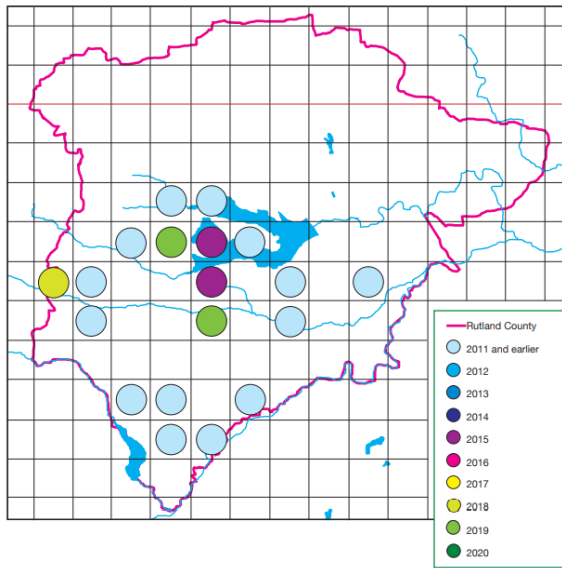
Omocestus viridulus**Common Green Grasshopper**

British status: common and widespread throughout.

Habitat: long sward in old grassland, damp meadows, woodland rides, hillsides with streams and gullies.

Rutland records: the earliest grasshopper to mature with adults stridulating in early June. Not so common as previously and it has been suggested this may be due to the increase of the Lesser Marsh Grasshopper. It has also been suggested that the hygrophilous eggs are laid on the ground and threatened by desiccation. Summer drought during recent years has caused a decline in this species. Long grass/marshy meadows at Empingham and Ridlington are favoured. The distinctive 'reeling' song lasting for 10-20 seconds starting softly, building up to a loud climax before ending abruptly.



Tetrix subulata**Slender Goundhopper**

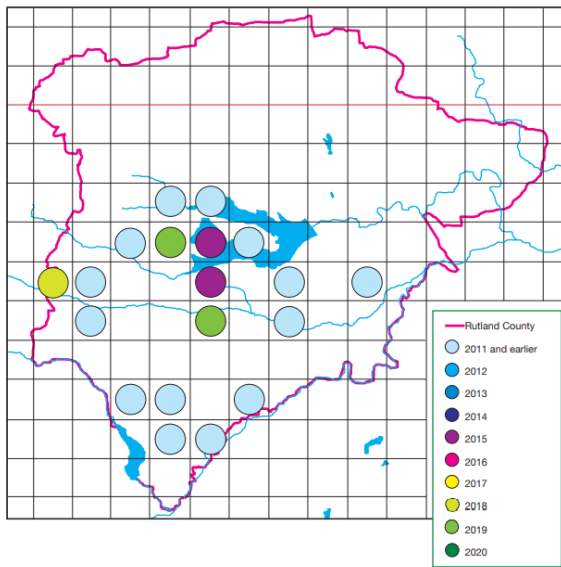
British status: England and South Wales.

Habitat: bare mud in wet or damp places such as ditches, pond margins, wet rushy fields, and rutted woodland rides.

Rutland records: hard to find as it is tiny and does not stridulate! Swims and flies well. In recent years, a slight upturn in reports from members is very pleasing probably due to young people with sharp eyes. Rutland Water Egleton and Lyndon reserves are notable for this hopper. Also from Burley on the Hill Woods, Ketton Quarry SSSI, Leighfield and Wing village allotments.



| | |
|-------------------------------|---------------------------|
| <i>Tetrix undulata</i> | Common Goundhopper |
|-------------------------------|---------------------------|



British status: throughout Britain.

Habitat: bare soil in woodland rides and clearings, quarries, rides in woodland.

Rutland records: probably under-recorded due to similarity to the Slender Groundhopper being tiny and no stridulating. However, easy to distinguish as the Common is dumpy and the pronotum is much shorter than in the Slender and does not extend beyond the hind knees. In addition there is a distinct keel along the top of the pronotum which is diagnostic. Rutland Water Egleton and Lyndon reserves are notable for this hopper, also Burley on the Hill Woods.



Steve Woodward

Appendix 1: The Geology of Rutland and its landscapes

CR Jones (1st January 2013)

With its rolling hills, prominent scarps, long ridges and wide open valleys, the Rutland landscape accurately reflects the underlying geology. The accompanying figure provides a simplified map of the geology of the county and a diagrammatic section shows how the strata are structurally disposed.

The bedrock geology is fairly simple. Shallow marine strata of Jurassic age are uniformly inclined at a low angle east or south-east. Only local faulting and folding disrupts this regional pattern. The lithologies vary upwards from soft, easily eroded mudstone and siltstone through more resistant marlstone, sandstone and ironstone to fairly hard limestone with some mudstone beds reappearing high in the succession.

The bedrock strata span the Jurassic period from the Lower Lias (200 million years ago) through the Middle and Upper Liassic Series of the Lower Jurassic to the Oxfordian Stage of the Upper Jurassic (150 million years ago). The Liassic formations are predominantly composed of dark mudstone, often silty, with occasional thin lenses of limestone. At the top of the Middle Lias is an intermittent harder layer of iron-rich sandy limestone termed the Marlstone Rock-bed. The mudstones are easily weathered to clays. They underlie the valleys and hill slopes to the west of the county where the heavy soils support neutral grassland but, for the most part the land is densely cultivated.

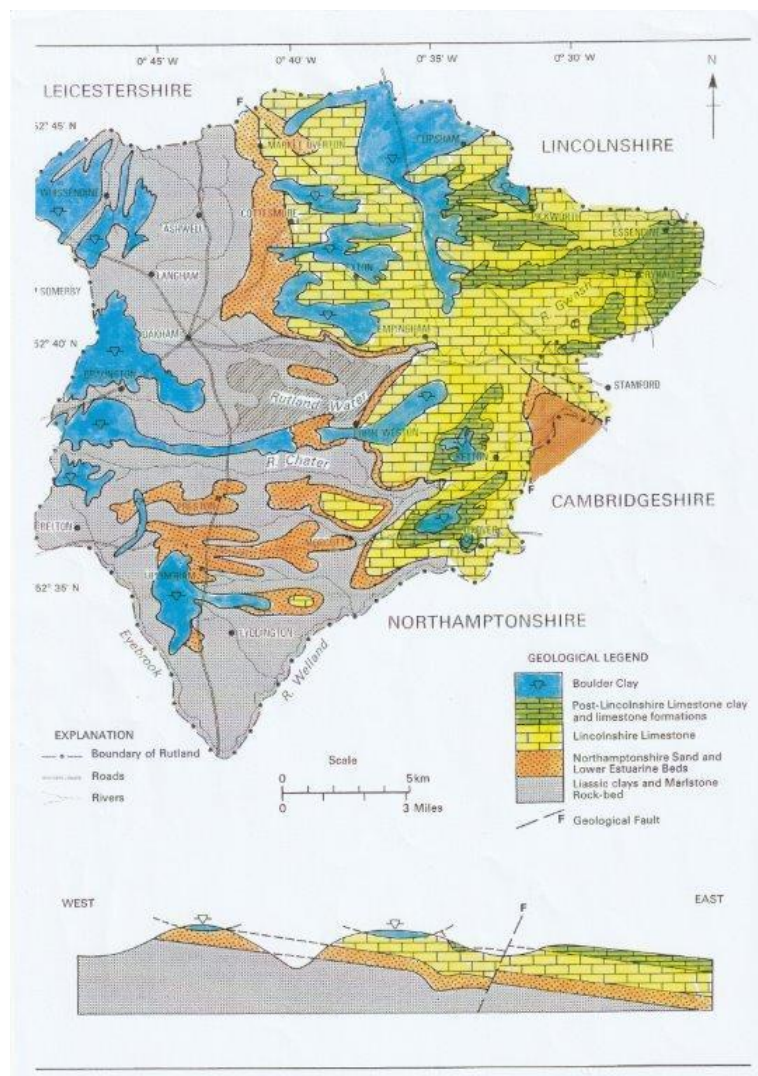
Above the Lias the early stages of the Upper Jurassic are marked by sandstone and ironstone formations. The sequence starts with a thin unit of running sands known formerly as the Lower Estuarine Series (now the Grantham formation). The over-lying beds of the Northampton Sand Formation are iron rich and hard. They build the scarp features running through central Rutland from Market Overton in the north to the Welland valley in the south. Eroscioal outliers from resistant caps the long east-west ridges on which stand the settlements of Manton, Preston, Ridlington and Uppingham in the south of the county. The rock produces the rich brown soils so distinctive of Rutland. These are slightly alkaline and, in undisturbed pastures, and especially where the ground has been mined for iron, they support vegetation with lime-loving affinities.

The eastern half of Rutland is underlain mainly by limestone. The strata include the thick sequence of bedded oolites and micrites of the Lincoln Limestone Formation and some thinner overlying units. The latter are the Blisworth Limestone and the higher Cornbrash Formation. These younger limestones are interstratified with black mudstone formations the highest unit in Rutland being the Oxford Clay. Because of the thickness of the Lincolnshire Limestone and its low easterly dip, the strata form a pavement sloping gently down to the Fenland basin. Easterly flowing streams cutting into this pavement have left a landscape of rolling hills and plateaux. Except for sink holes and the occasional dry valley, the scenery exhibits few other features typical of karst country. The limestone soils are characteristically thin, rubbly and decalcified. They dry out easily and are extensively cultivated for arable crops. The natural vegetation is calcareous grassland. Formerly this included heathland but this has been lost and the remaining refuges are verges and disused quarries which have been recolonised.

The debris dropped from melting ice and receding glaciers at the close of the Anglian phase of the Quaternary Ice Age (400,000 years ago) covers the bedrock in many parts of the county. Thus superficial till is mainly a stiff, dark clay formed from milled bedrock and usually contains boulders and pebbles of hard rock scraped up from the ground as the glacier advanced southwards. These clast materials include flint and chalk from the Cretaceous, limestone and fossils from the Jurassic, Bunter quartzite from the Triassic and gritstone and limestone from the Carboniferous. Sand and gravel deposited by glacial meltwater occurs

locally in small amounts. Because of the high content of material derived from chalk and limestone, and the predominance of clay, the till soils are calcium-rich and moisture retentive. These properties provide the conditions for a lush natural growth of herb-rich vegetation which finds refuge in verges, hedgerows and old woodland.

The development of Rutland's contrasting landscapes can be traced back to the mid-Tertiary Alpine earth movements which uplifted the Jurassic and earlier strata leaving them tilted gently towards the east. On this surface a consequent drainage pattern was established. Rivers rising in Leicestershire, like the Gwash and Chater, flowed eastwards across Rutland cutting deep valleys into the successive rock formations from the softer mudstones in the west to the harder sandstones and limestones in the east. Later subsequent streams provided the conditions for river capture and the formation of a subordinate north-south drainage system as occurs in the Vale of Catmose. This allowed scarps to develop mainly along the edges of the harder sandstone and limestone strata in a belt running south though the centre of the county. Further east, the sloping pavement formed by the limestone is dissected by both consequent and subsequent streams to form rolling hills. Less eroded parts of the pavement remain as plateau-like features.



The later Tertiary to early Quaternary surface was subsequently modified at the time of the Pleistocene ice age. During the Anglian phase, polar ice advanced south over the whole of Rutland. The valleys, particularly the Welland, Gwash and Eyebrook, were gouged out by the ice and further shaped by torrential meltwaters when the ice receded. This left the landscape much as we see it today.

Appendix 2: Gazetteer of sites

The localities mentioned in the text are listed below. Six-figure grid references for the approximate centre of each site are given.

Aldgate, Ketton (SK9820430);
 Armley wood (SK913077)

Barnsdale (SK906090)
 Barnsdale Gardens (SK911107)
 Barnsdale Lodge Wood (SK905087)
 Barnsdale Wood (SK913087)
 Barrow (SK890151)
 Barrow Village (SK893157)
 Barrowden (SK945999)
 Barrowden Road (SK945022)
 Beaumont Chase Farm (SP846987)
 Belmesthorpe (TF042102)
 Belton-in- Rutland (SK816103)
 Bloody Oaks Quarry NR (SK970108)
 Bloody Oaks Triangle/Verge (SK972112)
 Braunston (SK832066)
 Braunston Meadows (SK819058)
 Burley Wood (SK892098)
 Burley Village (SK882102)

Caldecott (SP868937)
 Coppice Leys (SK957012)
 Cold Overton (SK810101)
 Cottesmore (SK902136)
 Clipsham (SK970163)
 Clipsham Yew Tree Avenue (SK980168)
 Clipsham Park Wood (SK973169)
 Clipsham Quarry SSSI (SK981155)
 Cribb's Meadow NR (SK899188)
 Crown Well Bridge, Wing (SK883034)

Dawn's Paddock, Braunston (SK841075)
 Digby Farm plantation, North Luffenham (SK940032)

Eye Brook Reservoir (SP854955)
 Eye Brook Plantation SSSI (SP858955)
 Exton, Horn Mill (SK951106)
 Exton, North Brook (SK956090)
 Exton Park (SK935118)
 Empingham (SK950084)
 Empingham, Hereward Way (SK958078)
 Empingham, marshy meadows (SK956093)
 Edith Weston (SK927053)
 Essendine (TF047129)

Fort Henry (SK948121)
 Flitteris Park (SK820078)

Geeston (SK958038)
 Gibberts Gorse (SK014058)
 George Henry Wood (SK953159)
 Gorsefield, Oakham (SK850076)
 Greetham Golf Club (SK946135)
 Great Casterton (TF001087)
 Gunthorpe (SK869056)

Ketton Heath (SK975069)
 Ketton, Green Burial Field (SK975037)

Langham (SK843111)
 Leighfield CP (SK827036)
 Leighfield Fish Ponds (SK829039)
 Little Casterton (TF018098)
 Luffenham Heath Golf Club, SSSI (SK959022)
 Lyddington (SK876970)
 Lyndon Village (SK010044)

Manton (SK880046)
 Merry's Meadow NR (SK938157)
 Market Overton (SK855164)
 Morcott (SK924007)
 Martinsthorpe (SK866046)

North Luffenham (SK934032)
 Newell Wood, SSSI (TF004144)

Oakham (SK860089)
 Oakham Canal (SK865110)

Prior's Coppice NR (SK831051)
 Pickworth Great Wood (SK981148)
 Pickworth (SK992137)
 Pilton (SK914029)
 Preston (SK870023)

Quarry Farm, Stamford (TF010082)

Ridlington (SK847027)
 Rutland Water, dam (SK946074)
 Rutland Water, Egleton AWBC (SK879072)
 Rutland Water, Egleton NR (SK878075)
 Rutland Water, Lax Hill (SK885062)
 Rutland Water, Lyndon NR (SK894055)
 Rutland Water, North Arm (SK895085)
 Rutland Water, VTC (SK883084)
 Rutland Water, Egleton wet meadow (SK880067)
 Ryhall (TF035107)
 Ryhall Heath (TF020130)

Stoke Dry Wood (SP845978)
 Seaton Meadows SSSI (SP915979)
 The Seek, Braunston (SK839070)
 Stocken (SK952174)
 Stretton Wood (SK956170)

Turtle Bridge (SP927986)
 Thorpe-by-Water (SP892966)
 Teigh (SK865160)
 Tickencote (SK990094)
 Tinwell (TF006064)
 Tolethorpe (TF021104)
 Tunnely Wood, Exton (SK933121)
 Tolethorpe Oaks (TF020122)

Glaston Bridge (SK895016)

Hambleton (SK899076)

Hambleton Wood (SK908068)

Hinman's Spinney (SK914077)

Horn Mill (SK951104)

Hooby Wood, Stretton (SK937163)

Ingthorpe (SK995088)

Ketton/Empingham Verge (SK956060)

Ketton (SK981043)

Ketton Quarry NR (SK980060)

Tolethorpe Road verges SSSI (TF017107)

Uppingham (SP866996)

Walk Farm, Great Casterton (TF011118)

Wing Fishing Lakes (SK889024)

Weldon Farm (SP879943)

Wing village (SK893029)

Wing Burrows (SK895016)

Woodhead Castle, Great Casterton (SK996116)

Wardley Wood (SP840998)

Appendix 3: Some vignettes by the author

1. The fortunes of the Rutland colonisers

Up to September 1997, Rutland had nine recorded orthopteran species!

Oak Bush Cricket. *Meconema thalassinum*
 Dark Bush Cricket. *Pholidoptera griseoptera*
 Speckled Bush Cricket. *Leptophyes punctatissima*
 House Cricket. *Acheta domesticus*
 Slender Groundhopper. *Tetrix subulata*
 Common Groundhopper. *Tetrix undulata*
 Common Green Grasshopper. *Omocestus viridulus*
 Field Grasshopper. *Chorthippus brunneus*
 Meadow Grasshopper. *Chorthippus parallelus*
 Lesser Marsh Grasshopper. *Chorthippus albomarginatus*

The first new Orthopteran to appear in Rutland was the Lesser Marsh Grasshopper seen on 7 September 1997 at the Woodland Trust's Gorsefield site at Oakham. This grasshopper was discovered by Dr. Clive Jones and Phillip Rudkin; it then spread phenomenally all over Rutland, in suitable habitats, in long rank grasses, meadows and pastures, improved grassland, and old meadows. It is described in the newsletters as: Widespread and common!

The second to appear was Roesel's Bush Cricket when this beautiful Bush Cricket was discovered in grasses, by John Wright, on the track to Fieldfare hide, at the Rutland Water Egleton Reserve on 1st August 2001. In 2002, it was not recorded but by 2003, was found on the Lyndon and Egleton reserves as well as on the northern shore of Eye Brook Reservoir. The two-year egg-cycle was probably the reason no sightings were obtained in 2002. However, in the following years Roesel's Bush Cricket swiftly colonised almost every habitat in Rutland, in enormous numbers. This expansion caused the pleasing emergence of many of the macropterous forms which have been seen every year up to 2016. The stridulating of large numbers of males is noisy but remarkable! Described as extremely common and widespread!

The first record of Long-winged Conehead, *Conocephalus discolor* (now *fuscus*), was on 15th August 2003 when a visiting Orthopterist from Derbyshire, Roy Frost, discovered a pair amazingly, in the same rough grasses on the track to Fieldfare hide where the Roesel's had been found in 2001. With a single-year egg-cycle, this lovely green conehead spread rapidly over the years in all suitable habitats often in association with Roesel's. Described as common, and widespread! A small amount of the macropterous forms are found annually. Stridulating of this species always commences a week or two later than Roesel's which suggests that the Long-winged Conehead may hatch or mature later. Their stridulations are also amazing and loud but, surprisingly, they are often drowned out if they are close to Roesel's. I have solved this problem, when I use the bat detector at 19kHz for Roesel's, I then turn up the frequency to about 26kHz. This reduces the Roesel's songs and one can then listen to Long-winged Conehead.

Finally, fourth new species to appear in Rutland was the Short-winged Conehead, *Conocephalus dorsalis*. The long wait since 2003 for a new addition to our orthopteran list eventually came on the morning of 13th September 2007 at 9.50am. Conditions were good with a temperature of 22°C, dry, warm and 3/8 cloud. I was cruising slowly down the hill on the Hambleton Peninsular Road from the village and had my hand-held bat detector hanging out of the open window listening to the stridulating of Long-winged Conehead and Roesel's Bush Cricket in the rough grass verges. I then decided to stop and survey the verge to get an indication of numbers.

Suddenly, "I stopped in my tracks"! A new song was emanating from the long, mixed herbage - a consistent scraping sound with occasional winding down phrases before starting up again. At last, a newcomer! This was the stridulating of a male Short-winged Conehead. I was delighted but surprised to note the habitat which seems to be unusual for this conehead. However, the next step was to find the cricket, and to identify visually.

Evidence is required to log a new species for acceptance to the National Orthoptera Recording Scheme and to Rutland Natural History Society. I was only able to catch two males, which I duly photographed. Four days later, on the 17th September, I took two friends with me and we caught one male, and most importantly, two females. The females clinched positive identity (their ovipositors are upwardly curved) whereas the Long-winged Conehead female ovipositor is almost straight. Eventually, my sound-recording, and the photographs were sent to Dr Peter Sutton for verification.

One year later, a small group from the RNHS was on the North Shore of the South Arm of Rutland Water when I heard the stridulating of Short-winged Coneheads in a large patch of *Juncus* (typical habitat), and the group got to work catching females and males all being photographed.

This species is an enigma in Rutland! In July 2010, *Conocephalus dorsalis* made the short journey from the North Shore on to the nature reserve at Egleton. Since then it has successfully colonised suitable damp habitat on the reserve and can be found regularly. Then, in July 2015, they appeared in a small, typical patch of damp *Juncus* on the Lyndon reserve along the farm track near Tufted Duck Hide, west of the AWBC. Despite much searching away from Rutland Water, we have only discovered one other colony near the southern edge of Rutland at Caldecott on 28th September in damp grasses.

Rutland waits patiently for a newcomer!

2. The recent appearance and spread of the Long winged-Conehead and Roesel's Bush Cricket

"It has been clear for some time that a number of species are currently exploiting the incremental increases in average annual temperatures, and that certain formerly scarce species, such as the Long winged-Conehead, *Conocephalus fuscus*, have enjoyed significant range-expansions in recent years".

(British Wildlife, June 2006, p354)

The comments most certainly apply to the two species of Bush Crickets in the following article. Both of these orthopterans were on the door-step of Rutland and the information from the National Orthoptera Recording Scheme newsletters confirms this.

Long winged-Conehead

Cambridgeshire VC29 in 2000
Huntingdonshire VC31 in 2000
Leicestershire VC 55 in 2001

Roesel's Bush Cricket

Ashton, Oundle, and Weldon, Corby VC32 in 2000
Cambridgeshire (well established) VC29 in 2000
Kirby Underwood & Bourne, Lincolnshire VC53/54 in 2000

For the Long winged-Conehead, it all started in Rutland on 15th August 2003. Roy Frost, Orthoptera recorder for Derbyshire and Nottinghamshire, was visiting the Bird Watching Fair at Egleton, Rutland Water. Roy decided to explore the Roesel's Bush Cricket site where he discovered a pair of Long winged-Coneheads in the rough grasses along the path towards Fieldfare Hide. This proved to be the first Rutland sighting for this species.

Since that date, this conehead has had a remarkable range-expansion in Rutland: and populations have built up very quickly. The reason for this is that this species has a single year-egg cycle; and the warmer summers have aided dispersal. They are now found all over the Rutland Water Egleton and Lyndon reserves. Away from that area, other locations have been occupied, including: Wing fishing lakes, Lyddington Meadows, Uppingham. Horn Mill, Exton. Bloody Oaks nature reserve, Empingham. Beaumont Chase Farm. Quarry Farm, Stamford. Clipsham Quarries, Luffenham Heath Golf Club, Barrowden Heath, and Belmesthorpe Bridge, Ryhall.

Roesel's Bush Cricket made its first appearance in Rutland at the Egleton Reserve, Rutland Water, and 1st August 2001. Wildlife artist and warden, John Wright, discovered one female on the path towards Fieldfare hide where it seen twice more during August 2001. This cricket was sought after in 2002 but none were located. However, 2003 proved very successful indeed with sightings of males and females on both Egleton and Lyndon reserves at Rutland Water.

Roesel's Bush Cricket is the second most numerous cricket in all available habitats in Rutland, and also the noisiest. It has truly taken over Rutland!

3. The first appearance of the Short-winged Conehead, *Conocephalus dorsalis*, in Rutland

On the morning of Thursday 13th September 2007, I stopped off along the Hambleton Peninsular Road, and decided to check the populations of the orthoptera in the thick grass verges. Waving the bat-detector from side to side, I suddenly picked up a new stridulation amongst the regular sounds. Listening intently, I concentrated on this new song and was delighted to identify the Short-winged Conehead, *Conocephalus dorsalis*. At last - the first for Rutland!

However, to confirm the sighting, I needed to carry out two operations: To sound-record the stridulating and to finalise the procedure: to catch a female. The sound was no problem but to pot a female I called in mother and son team Gill & Frances Chiverton (RNHS members). Frances' young sharp eyes soon picked out a female and he captured two and also one male. Photographs were taken and the sound-recordings plus photographs were eventually sent to Dr Peter Sutton, head of the National Orthoptera Recording Scheme. The sighting was duly accepted, and the story appeared in *British Wildlife* October 2007 p54.

The reason for catching a female was to differentiate between Short-winged and Long-winged species. The female's ovipositors are slightly different: Short-winged Conehead has an upward curve whereas the Long-winged Conehead has a long and almost straight ovipositor. The identification is a clincher!

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