A Guide to the Orthoptera and Dermaptera of Shropshire

by David W. Williams

Excluding escapes, accidentals and naturalised aliens (eg Egyptian grasshopper, house cricket) fifteen species of Orthoptera (grasshoppers, crickets etc) and three species of Dermaptera (earwigs) have been recorded as breeding in Shropshire. Cockroaches & mantids (Dictyoptera) are also included within the 'Orthopteroid' insects, as are stick insects (Phasmida). Britain has a small number of native cockroach species (the taxonomy is uncertain). There is one record of a native species (tawny cockroach, an accidental introduction of one individual) and there are old records of Oriental cockroach (an alien inhabitant of artificially heated places) but it is very unlikely that any cockroaches will become established in the county. This guide covers all the species likely to be encountered in the field in Shropshire.

Orthoptera; Caelifera: grasshoppers and groundhoppers

Grasshoppers overwinter as eggs, hatch in Spring and mature during June and July, persisting into Autumn. Males sing to attract females; these songs are distinctive and, as grasshoppers tend to be very variable in colour & pattern, are one of the best ways to identify males to species.

Groundhoppers overwinter as either nymphs or adults and can be found as adults in most months of the year. Superficially similar to small grasshoppers, groundhoppers differ from them in several ways. Most obviously, the pronotum (see below) extends backwards over the entire abdomen, or beyond it. They do not sing. They are strong & willing swimmers. Groundhoppers are insects of bare ground with a covering of mosses or algae, upon which they feed. Like grasshoppers, they are extremely variable in colour & pattern. The best way to find them is to walk slowly through suitable habitat, watching for small insects jumping around your feet. They also seem to be irresistibly attracted to white trays placed on the ground, white plastic bags weighted down at the corners etc and will quickly jump onto them.

Orthoptera; Ensifera: bush crickets

Like grasshoppers, bush crickets overwinter as eggs. However, they hatch later in Spring and do not mature until late July or August, persisting into late Autumn (frosts permitting). They are characterised by their extremely long antennae. They are much less variable than the Caelifera; some bush crickets hardly exhibit any variation in colour or pattern, whilst others may have two distinct colour forms. Females are readily identified by their prominent ovipositors. Their songs are higher pitched than grasshoppers' and become inaudible to ageing human ears; a bat-detector can be used to reveal their calls.

IDENTIFYING ORTHOPTERA

Grasshopper Nymphs

Fourth Instar Nymph

Grasshopper nymphs can cause confusion in a number of ways. They may be confused with groundhoppers due to their smaller size. Older nymphs can be confused with adult grasshoppers, especially adult female meadow grasshoppers (discussed below).

Nymphs are best told by their developing wings, which are present in older nymphs as non-functioning 'wing buds' (young nymphs being wingless). Grasshopper nymphs usually go through four 'instars' (growth stages), wing buds becoming progressively more visible in each successive instar.

Adult female meadow grasshoppers typically have very short wings, which can lead to confusion with nymphs. Note the nymph's wing buds. Long, radiating veins may be seen, sometimes (as here) picked out in a contrasting colour, but the buds otherwise lack a defined *network* of veins enclosing small cells. This network is clearly present in the short wings of female meadow grasshoppers. The buds are thick & 'leathery'. All four buds are often at least partly visible, whereas the tiny hind wings are always hidden by the fore wings in adult meadow grasshoppers.

It is probably best not to attempt identification of grasshopper nymphs, though this is usually possible, at least with older nymphs, with experience.

Grasshopper Pronota

The single most important visual identification feature in either sex is the pattern on the dorsal surface of the pronotum (saddle-shaped plate behind the head). Three ridges run along it; one on the dorsal midline, the other pair on the lateral edges of the dorsal surface. This pair of 'side keels' varies from straight and parallel to sharply inflexed, and is characteristic of species.

A **B** **C** **D** **E**

A: lesser marsh grasshopper (straight/parallel or slightly incurved). **B**: meadow grasshopper (slightly incurved; on average slightly more so than lesser marsh). **C**: common green grasshopper (moderately incurved). **D**: field grasshopper (strongly inflexed). **E**: mottled grasshopper (strongly inflexed, on average slightly more so than field grasshopper). Note also that the pronotum is proportionately shorter than in other species, being no longer than the head.

Recording

Records can be submitted via *iRecord.org.uk* or alternatively emailed to me (Shropshire County Recorder) here Records should ideally include date, OS grid reference or clear locality, name of recorder, brief habitat details & anything else of interest. Records of rare or unusual species should be accompanied by a good-quality photograph.

Species Accounts, Acknowledgements and References

[1]*Grasshoppers, Crickets and Cockroaches of the British Isles,* David R. Ragge (Frederick Warne & Co. Ltd, 1965). All length measurements in the below species accounts are taken from this work, except common & lesser earwigs, which are taken from *Grasshoppers and Allied Insects of Great Britain and Ireland,* Judith A. Marshall & E.C.M. Haes (Harley Books, 1988) and the southern oak bush cricket, taken from *A Photographic Guide to the Grasshoppers & Crickets of Britain & Ireland*, Martin Evans & Roger Edmondson (WGUK, 2007). Lesne's earwig measurements are my own.

 Conocephalus dorsalis male cerci photographed by permission of Liverpool World Museum.

COMMON GREEN GRASSHOPPER

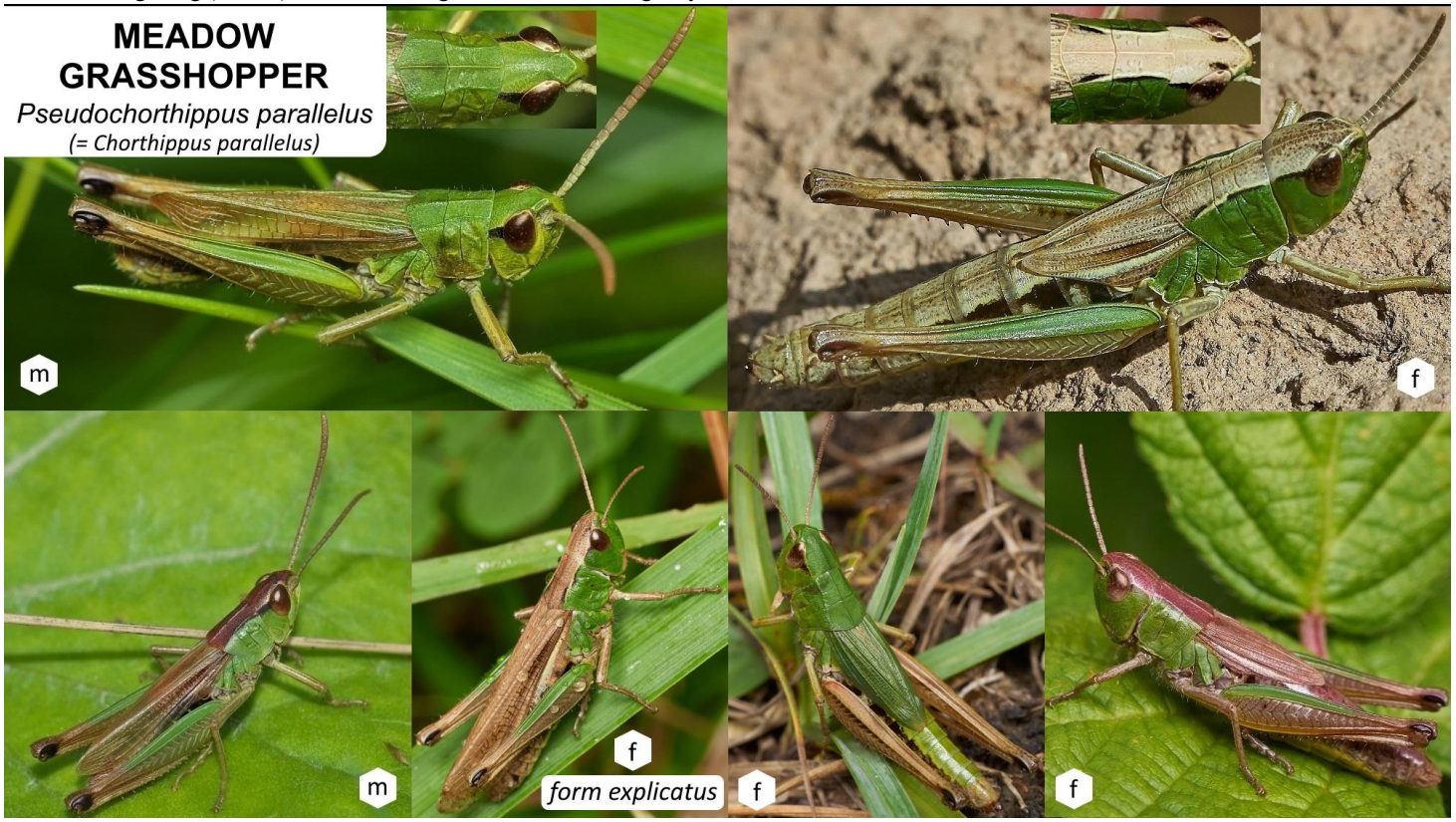
Omocestus viridulus

- Length (head to wingtips): Male 15mm–19mm; Female 17mm-22mm. Males are noticeably slimmer than females, with longer antennae.
- Two main colour forms in both sexes. **Males**: 'green' or 'brown'. Green males vary little in appearance. Brown males are usually some shade of olive- or khaki-brown, but this is variable, as is the degree of mottling on the sides. Legs in this form are usually variably yellowish. **Females**: 'green' or 'green back with brown sides'. Green females vary little. The sides of 'brown'-sided females can actually be anything from pale grey to dark brown or purple. Sandy-brown-sided is a common form. There is no red on the abdomen in either sex.
- Wide range of lush, grassy habitats. Avoids dry / parched areas.
- The earliest grasshopper species to mature, usually during the first or second week in June.
- Song: long (10-20s) bursts of ticking, like a free-wheeling bicycle. Videos here and here

MEADOW GRASSHOPPER

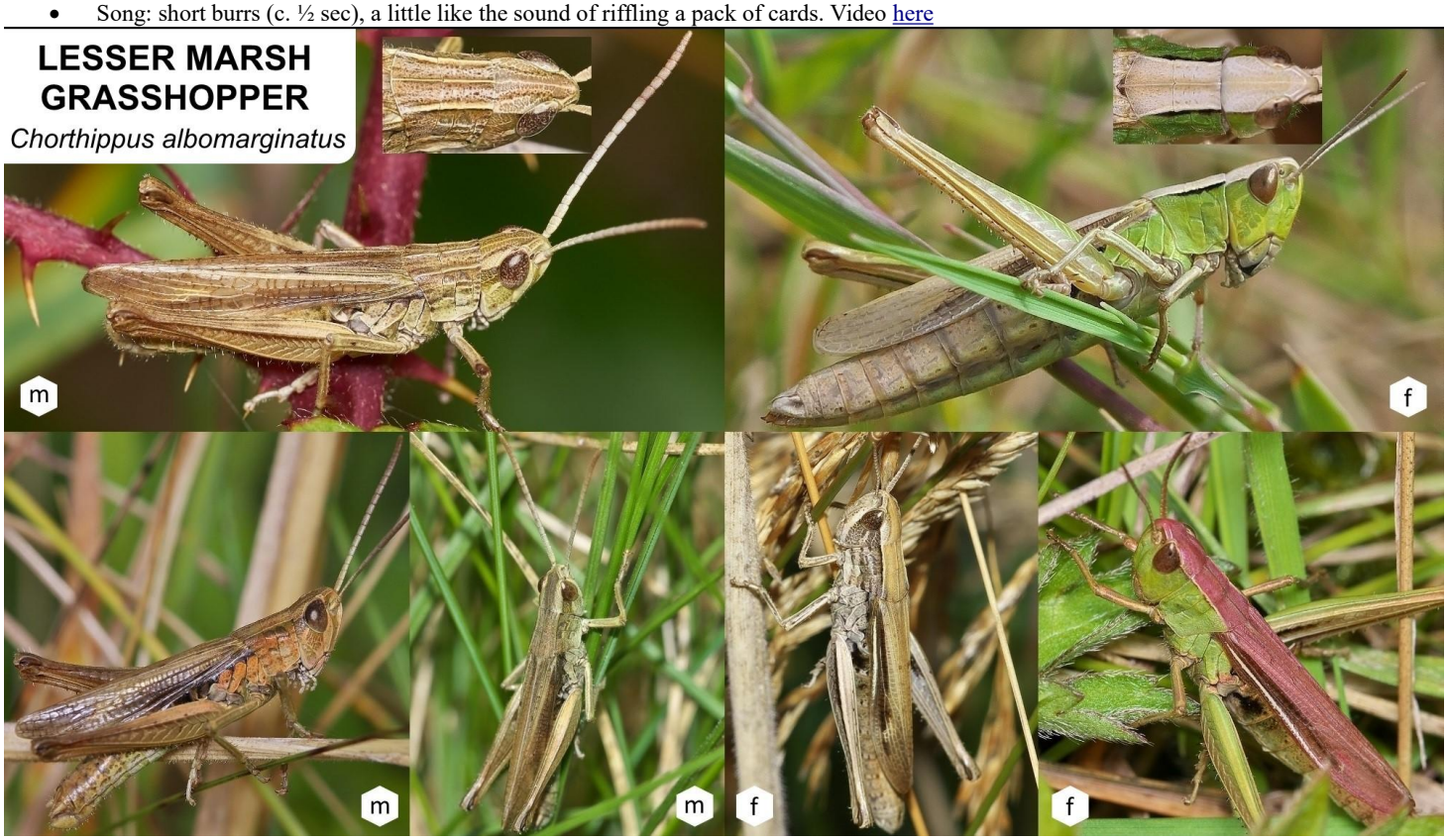
Pseudochorthippus parallelus

(= Chorthippus parallelus)



- Length: Male (head-wingtips) 10mm-16mm. Female (head-tip of abdomen) 17mm-22mm. Males much smaller than females, with much longer antennae.
- Britain's only flightless grasshopper, but can occasionally produce long-winged, flying individuals (form *explicatus*).
- Very variable in appearance. The most commonly occurring forms are shown above, but brown & purple (female only) forms occur, plus forms similar to those shown but with the colours reversed eg green back + buff sides. **Male**: relatively small. Usually black / very dark hind 'knees' & black 'teardrop' behind eye, giving a 'sad-eyed' appearance. Wings usually not reaching to hind knees. **Female**: typically very short-winged, unlike any other adult British grasshopper. See also 'Grasshopper Nymphs' section. All-green forms of either sex have the dorsal surface of the pronotum uniformly green, lacking any black & white markings (unlike common green grasshoppers).
- Wide range of damp & dry grassy habitats.
- Song: 1 – 2 sec burst of dry, rattlesnake-like rattling. Video here

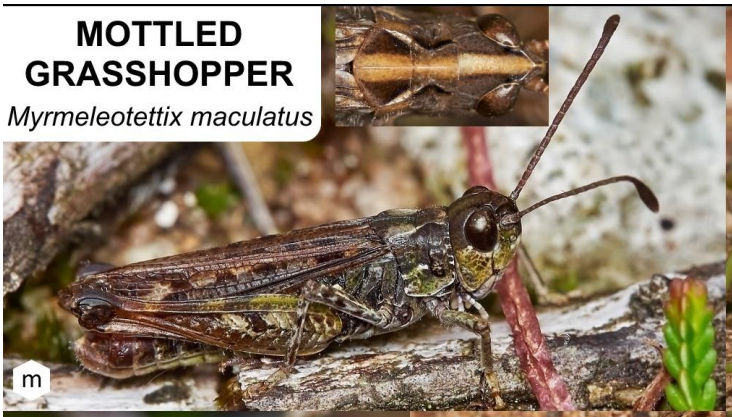
- Length (head to wingtips): Male 15mm-19mm. Female 19mm-25mm. Male has noticeably long wings & antennae; females are the largest grasshoppers likely to be encountered in Shropshire.
- Extremely variable in colour & pattern; probably no two specimens are identical. However, forms similar to the four marked '*****' together make up approximately 80% of most populations[1]. The remaining pictures show two of the very many other, less common, colour forms.
- Key identification features: Strongly inflexed side-keels on pronotum. Sexually mature adults of both sexes with red marking on abdomen (paler / orange when immature). Quite densely hairy on the underside of the thorax. Long-winged: males' wingtips protrude well beyond hind knees, females' at least to, and usually somewhat beyond, hind knees.
- Dry / parched grassy places usually with a short, sparse sward eg road verges. Avoids lush, damp vegetation.
- Song: short burrs (c. ½ sec), a little like the sound of riffling a pack of cards. Video here

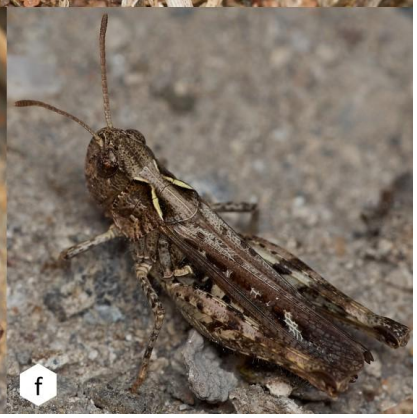


- Length (head to wingtips): Male 14mm-17mm. Female 17mm-21mm. Males obviously smaller than females, with much longer antennae.
- Generally subdued browns & greens, but brighter individuals do occur. Near-straight side-keels on pronotum should prevent confusion with all but the closely related meadow grasshopper.
- **Male**: compared to meadow grasshopper, wings are somewhat longer & lacks very dark 'knees' and 'teardrop'. Song is distinctly different.
- **Female**: fully winged, but wingtips usually not reaching hind knees. Typically with a white stripe along leading edge of forewing.
- Formerly strongly associated with damp habitats, but has expanded its range into dry grassland.
- Song: soft, short burrs (c. ½ sec), repeated 3 to 5 times at 1 to 2 sec intervals. The male then moves position before repeating. Rather similar to field grasshopper song, but chirps are a little longer & softer. Video here

MOTTLED GRASSHOPPER

Myrmeleotettix maculatus





- Length (head to wingtips): Male 12mm-15mm. Female 13mm -19mm. Shropshire's smallest grasshopper species.
- Very variable. Typically a cryptic mixture of several colours with blotches & stripes. Wings are never green, even in mainly green specimens.
- **Male**: clubbed antennae. Red colouration on abdomen develops in sexually mature males only (females develop an orange tinge at most).
- **Female**: antennae slightly thickened towards tip (can be hard to discern). See also below.
- Dry, parched, sunny habitats with bare ground & sparse vegetation, eg south-facing slopes. Intolerant of shade or damp.
- A habitat specialist; field grasshopper is the grasshopper most likely to be found in association with this species. Males' small size & clubbed antennae are diagnostic, but there may be size-overlap between female mottled & male field. Note though the obviously long wings & antennae of male field grasshopper, plus the red markings on the abdomen (absent in female mottled).
- Song: bursts of sound lasting 10-20 sec, starting very quietly & steadily increasing in volume before stopping abruptly. The sound has a swishing / wiping quality, a little like the sound of sandpapering. Video here

COMMON GROUNDHOPPER

Tetrix undulata

- Length: Male 8mm-9mm. Female 9mm-11mm.
- Pronotum extends to tip of abdomen.
- Bulky appearance, with very pronounced central keel on pronotum
- Flightless.
- Habitat: bare ground, either dry or damp.

SLENDER GROUNDHOPPER

Tetrix subulata

- Length: Male 9mm-12mm. Female 11mm-14mm.
- Pronotum & wings extend 3 to 5mm beyond tip of abdomen.
- Slightly smaller & slimmer than *T. undulata*, but extended pronotum gives greater overall length.
- Fully winged & capable of flight.
- Restricted to bare ground in damp habitats, eg pond margins, damp woodland rides. However, flies readily & may turn up in seemingly unsuitable habitat.

NOTE: slender groundhopper nymphs lack the extended pronotum of adults, but are less bulky & flatter-backed than common groundhoppers.

DARK BUSH CRICKET
Pholidoptera griseoaptera

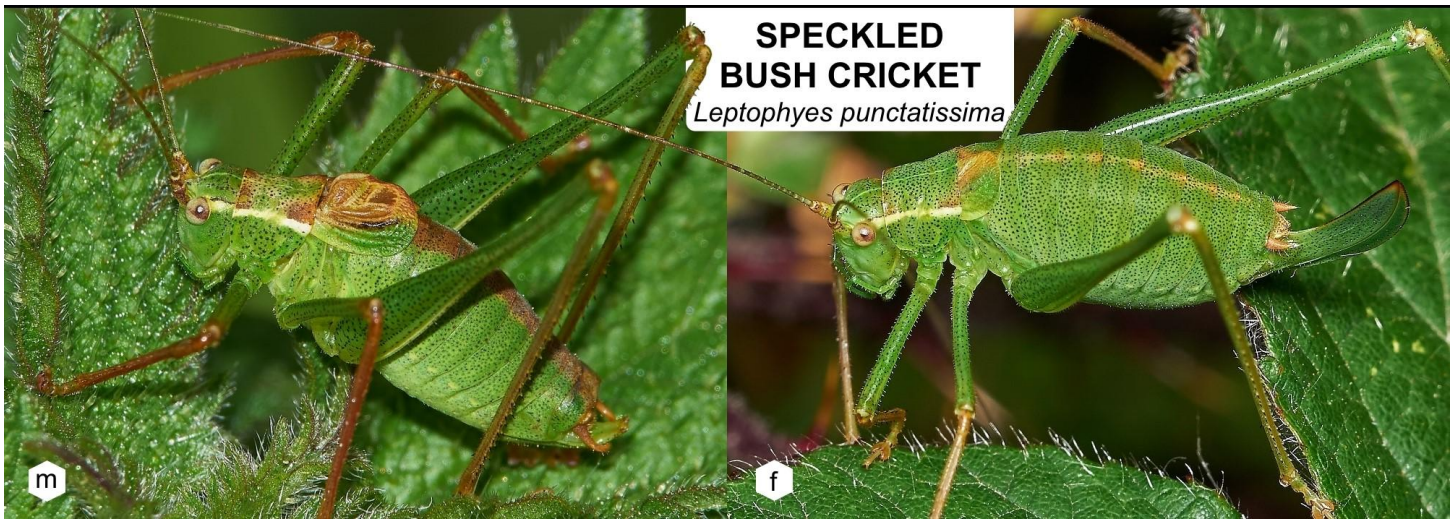
- Length (head to tip of abdomen): Male 13mm-20mm (ave. 14.5mm). Female 13mm-20mm (ave. 17mm) + ovipositor ave. 10mm.
- Always short-winged & flightless. Females' wings reduced to tiny flaps.
- Shade of brown can vary from greyish to chestnut. Females tend to be paler & less contrastingly marked.
- Adults are initially strongly nocturnal, but as the season progresses into Autumn they become increasingly active in daylight / sunshine.
- Found in rank herbage, scrub. Typically found on bramble; in Shropshire often found in stands of Indian balsam on the banks of the Severn.
- Song: short, harsh chirps, repeated every 3-4 sec, 22 kHz. At 45 years old I could still hear this species easily. Video here (natural sound).

ROESEL'S BUSH CRICKET
Roeseliana (=Metrioptera) roeselii

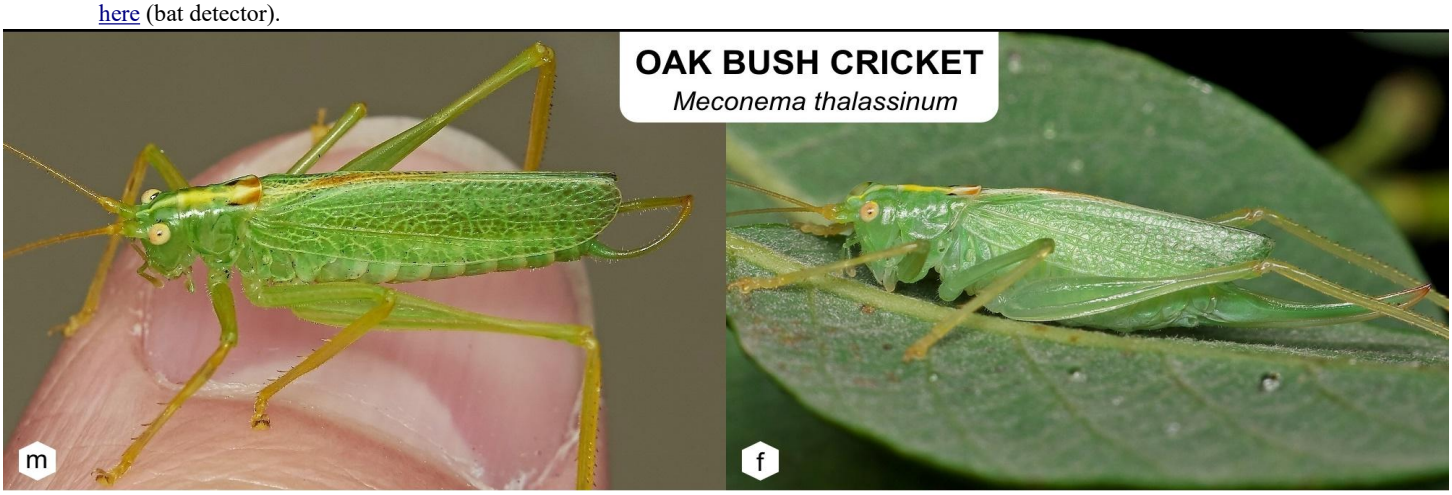
- Length (head to tip of abdomen): Male ave. 14mm. Female ave. 17mm + ovipsitor ave. 5.5mm.
- Typically flightless & short-winged, but fully-winged, flying specimens (form *diluta,* pictured *right*) are not unusual. The wings quickly become worn & tattered.
- Side-flaps of pronotum with yellow edge all around**.** Sides of thorax with yellow spots. Dark herringbone pattern on hind femora. Variation: Face & sides of body can be extensively green.
- Found in rank grassland. Males sing in sunny weather from a semi-concealed position in tall herbage.
- Song: Long, 'reeling' churr, like the sound of a wind-up toy, or crackling power lines. 20 kHz. At 45 years old I could still hear this species easily. Videos here (natural sound) & here (bat detector)

BOG BUSH CRICKET
Metrioptera brachyptera

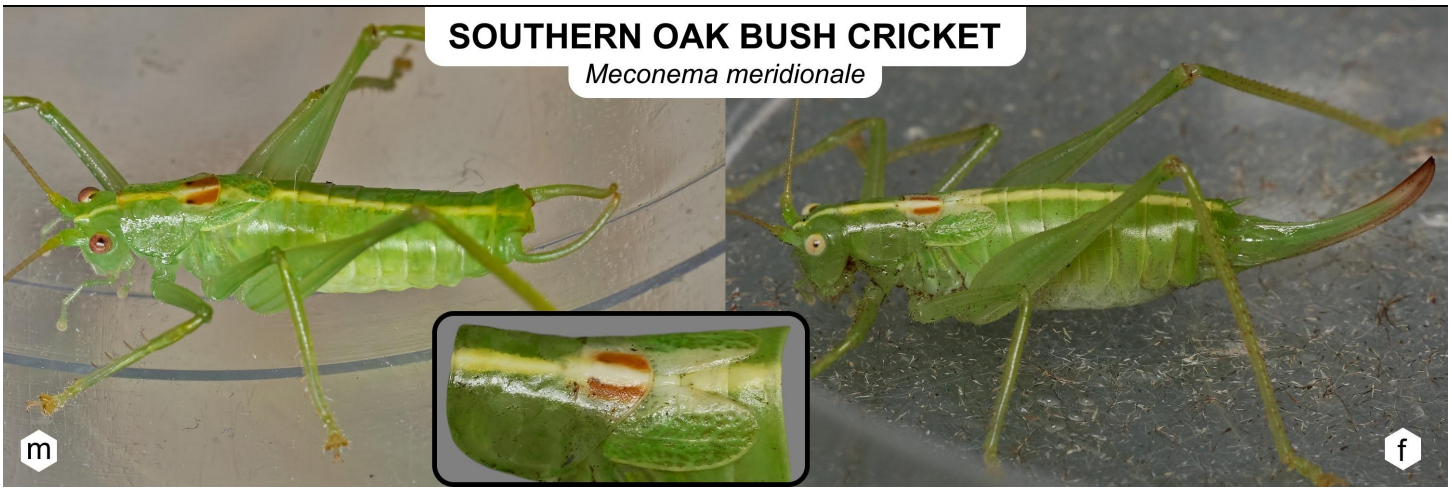
- Length (head to tip of abdomen): Male 12mm-18mm (ave. 14mm). Female 13mm-21mm (ave. 16mm) + ovipositor ave. 9mm.
- Usually flightless & short-winged; very rarely produces a fully-winged, flying form (f. *marginata*).
- Side-flaps of pronotum with pale/buff rear edge only. Solid black stripe on hind femora. Variation: Most adults develop green colouration as shown *above left* on male. Nymphs lack this green pigment & some adults do not develop it, as shown *above right* on female (though this individual is probably still 'teneral' and has simply not yet attained her full green colouration).
- Restricted to wet heathland, with cross-leaved heath & purple moor-grass, & below 250m altitude. In Shropshire, found on northern mosses, Hodnet Heath (private) and Catherton Common in the south, though absent from much of the latter due to altitude.
- Song: short chirps repeated at a rapid, even tempo (2 – 6 per sec). 25 kHz. Loud to younger ears, but at 45 years old I could only hear this species quietly at a range of about 2m or less. Video here (bat detector).



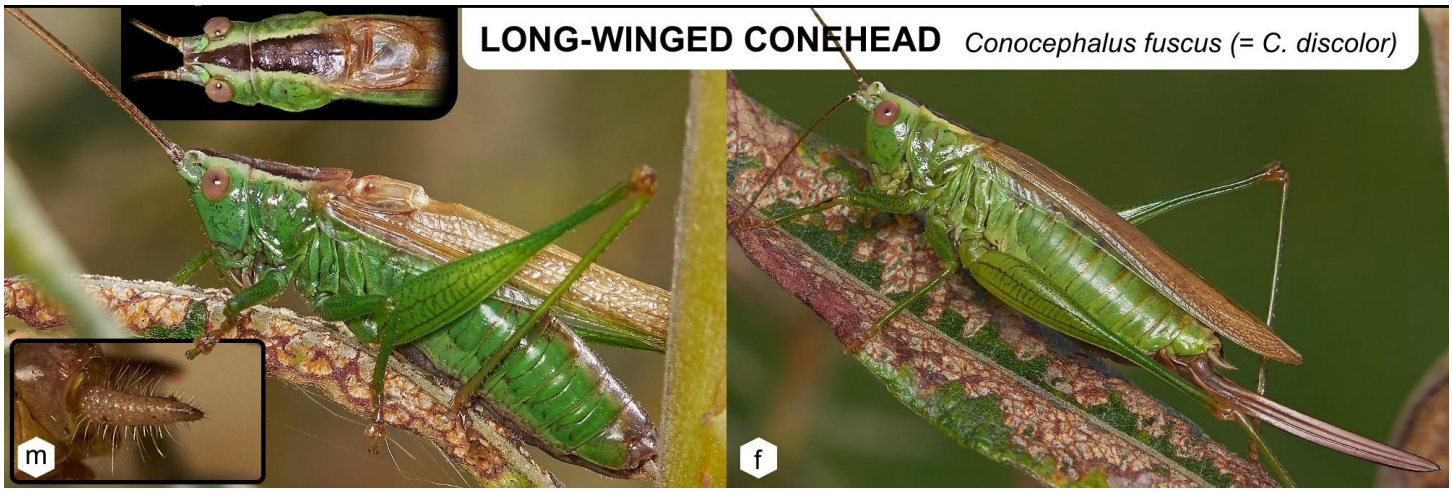
- Length (head to tip of abdomen): Male 9mm-16mm (ave. 11mm). Female 11mm-18mm (ave. 14mm) + ovipositor ave. 7mm.
- Always very short-winged & flightless.
- Unvarying in appearance. Long, spindly legs. Always covered in fine black spots. Small nymphs are particularly spotty.
- Found in brambles, scrub, overgrown hedgerows and rank vegetation (if with adjacent trees/shrubs). Adults will ascend high into the tree canopy where the opportunity arises, where a bat detector will pick them up overhead.
- Active both by day & by night. Both sexes call: females answer males' chirps with similar but slightly softer calls.
- Song: Short clicks/chirps, a little like tutting. 40kHz. Inaudible. With a bat detector these chirps can be detected at up to c.30m range. Video here (bat detector).



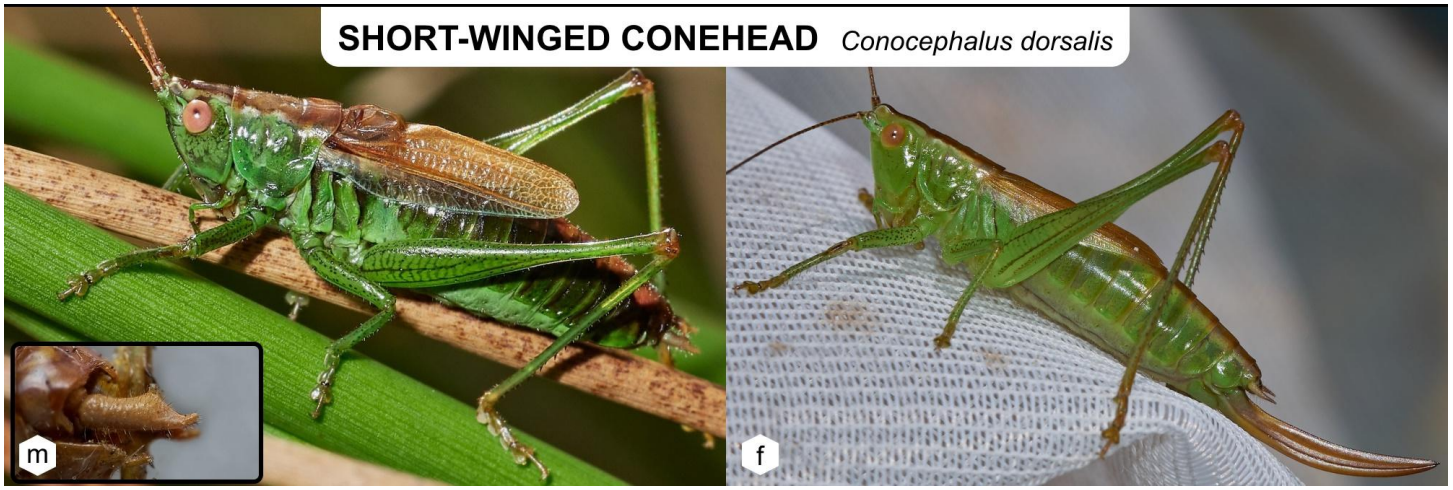
- Length (head to wingtips): Male 14mm-17mm (ave. 15mm). Female 14mm-17mm (ave. 16mm) + ovipositor ave. 9mm.
- Fully winged & flies readily. Appearance unvarying. Slender (especially male) & long-legged.
- Fully nocturnal & arboreal. Attracted to light; may enter houses, moth-traps (or rest in uplit foliage above them) etc.
- Found in a wide range of mainly deciduous trees, e.g. oak, lime, beech, apple etc. Nymphs seem to be beaten out more often than adults, presumably simply because they are more numerous. Mainly or entirely carnivorous, preying on caterpillars, aphids etc.
- Song: Does not stridulate. Male drums on leaf with foot (inaudible).



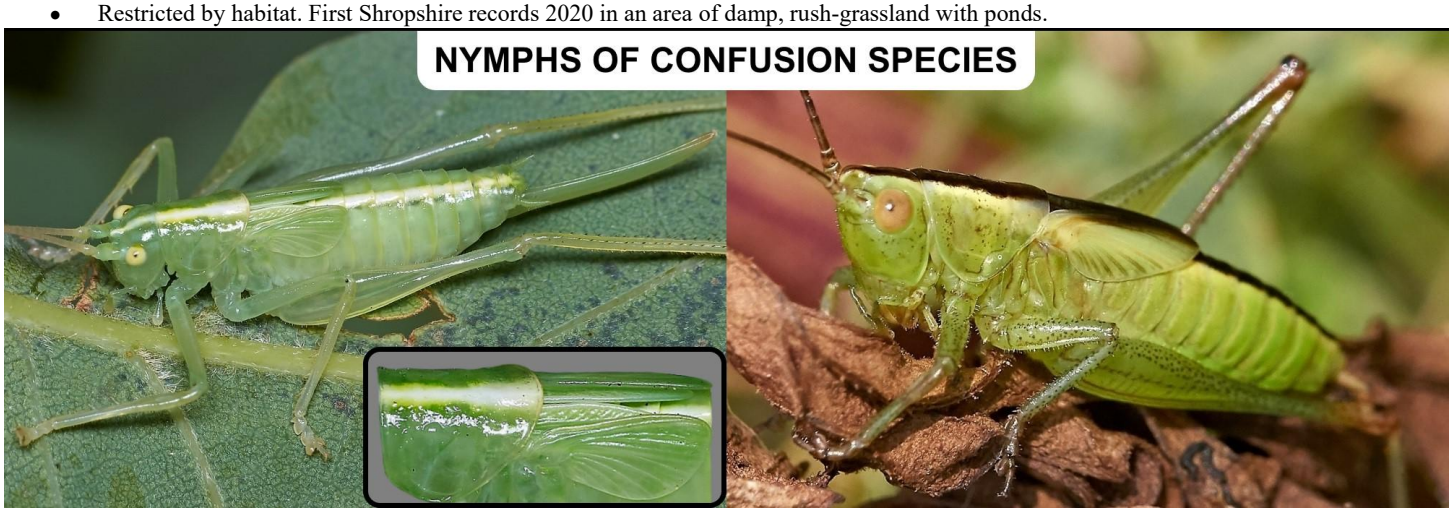
- See also 'Nymphs of Confusion Species' *below*.
- Length (head to tip of abdomen, excluding appendages): Male 11mm-15mm. Female 11mm-17mm + ovipositor 7mm-8mm.
- Similar to *M. thalassinum* in appearance, life-history & habits (ie arboreal, nocturnal, predatory) except that it is flightless and very short-winged**.** Male also drums with foot, as *M. thalassinum*.
- Adults should be easily separable from *M. thalassinum* due to vestigial wings. Nymphs of *M. thalassinum* may cause confusion, but note that a) nymphs of both species lack the pair of red/orange markings on the pronotum and b) nymphs' wing buds are quite different in structure to adult *M. meridionale* wings, lacking a defined network of veins & cells.
- First recorded in the UK in south-east England in 2001, this species is spreading and was found in Shropshire for the first time in 2020, since when breeding has been confirmed. The spread of this species is presumed to be human-assisted and as such it may turn up anywhere, but urban and industrial areas are the most likely to produce records.



- Length (head to wingtips): Male 16mm-21mm (ave. 18mm). Female 16mm-22mm (ave. 19mm) + ovipositor ave. 10mm.
- Fully winged & capable of flight. Wing-length variable, but always longer than abdomen; sometimes very considerably so.
- Typically green with brown wings & dorsal stripe, and purple/brown underside. A pale brown form occurs rarely.
- **Male**: in side view, cerci (appendages at end of abdomen) more or less straight & evenly tapering (see detail & *cf C. dorsalis*)**.**
- **Female**: ovipositor brown, very long & almost completely straight**.**
- Found in rough grassland, rushes etc. Typically occurs in stands of soft rush. Diurnal; males sing mainly in warm / sunny weather.
- Song: prolonged, continuous, fast-paced hissing tick. 30KHz. At 45 years old I could only hear this species quietly at a range of about 1m, but it can be detected at 25m range with a bat-detector. Videos here & here (bat detector) and here (natural sound).



- Length (head to tip of abdomen): Male 11mm-15mm (ave. 13mm). Female 12mm-18mm (ave. 15mm) + ovipositor ave. 9mm.
- Usually short-winged/flightless. A long-winged/flying form (f. *burri*) occurs which can be confused with *C. fuscus* (check cerci / ovipositor).
- Typically coloured as *C. fuscus*. A pale brown form also occurs very rarely.
- **Male**: in side view, cerci reduce abruptly in diameter near tip, which is upturned (see detail & *cf C. fuscus*). **Female**: curved ovipositor**.**
- Found in reedbeds & other damp habitats eg rush-meadows, pond margins etc. often in association with *C. fuscus.*
- Song: Similar to *C. fuscus* but higher-pitched (40kHz; virtually inaudible without bat-detector) & with an intermittent secondary sound, which is slower-paced. Check *C. fuscus* colonies at 40kHz for this call. Videos: here and here (bat-detector).
- Restricted by habitat. First Shropshire records 2020 in an area of damp, rush-grassland with ponds.



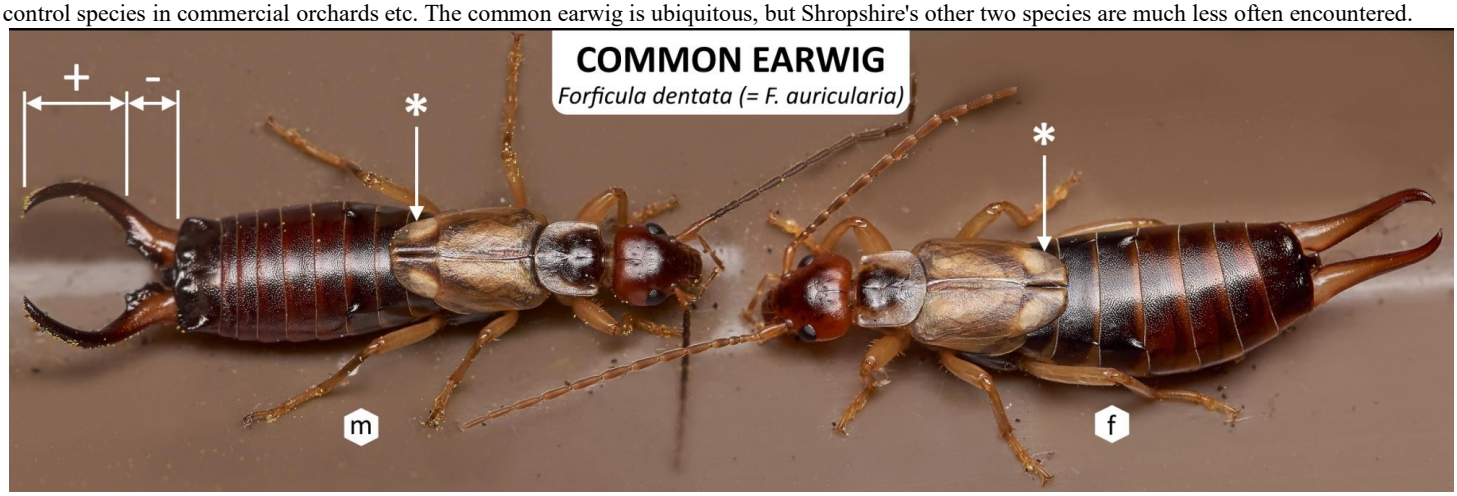
A: oak bush cricket, *Meconema thalassinum,* final instar (female) **B:** long-winged conehead, *Conocephalus fuscus,* final instar (male)

A: oak bush cricket: nymphs have a white dorsal stripe, unevenly edged with yellow. Lacking any red or black markings on pronotum. Eyes pale yellowish. Older nymphs have wing-buds (absent in young nymphs) of characteristic shape & structure, showing radiating veins, but without a network of small cells. Southern oak bush cricket nymphs are similar but show much smaller wing-buds at comparable stages of development.

B: long-winged conehead: nymphs have a very dark brown (almost black) dorsal stripe. Older nymphs have wing-buds (absent in young nymphs) of characteristic shape & structure, showing radiating veins, but without a network of small cells. Short-winged conehead nymphs are very similar, but show smaller wing-buds at comparable stages of development.

Order Dermaptera: Earwigs

Earwigs possess a pair of forceps at the end of their abdomen. The shape of these forceps, and the presence or absence of visible hind-wingtips, are key identification features. They are omnivores but their consumption of aphids, psyllids, scale insect etc has caused them to be used as biological pest control species in commercial orchards etc. The common earwig is ubiquitous, but Shropshire's other two species are much less often encountered.



- Length: head/body 10mm-15mm. Forceps: male 2.5mm-8mm; female 2.5mm.
- Note presence of visible hind-wingtips '*****' and shape of male's forceps, with broad, basal section clearly shorter than slender, curved section.
- Matures to adulthood in late Summer. Mating takes place in Autumn. In late Autumn pairs excavate a nest chamber, typically under a rock, in which they overwinter. The female lays a clutch of eggs during Winter, whereupon the male is probably evicted, most dying before Spring. The female tends the eggs & continues to feed & guard hatchlings in Spring. Females usually produce a 2nd brood in late Spring from the previous Autumn's mating.
- Fully-winged and can fly, but seemingly does so only very rarely.
- **Nymph** (*right)*: Note the slender forceps. Older nymphs have 'w'-shaped wing buds. First and second instar nymphs remain in the brood chamber, tended by their mother.

- Length: Head/body 7mm-11mm. Forceps: Male 2.5mm; female 2mm. About two-thirds the size of *F. dentata.*
- Overall brighter, redder colour than *F. dentata*. Flightless: note the absence of visible hind-wingtips (*****) and shape of male's forceps, with broad, basal section as long as slender, curved section.
- Matures to adulthood in late Summer. Sexes overwinter separately in casual refugia. Female excavates a nest chamber at the end of Winter and lays her first clutch of eggs. Eggs & hatchlings are tended until nymphs quit the nest mid-way through first instar (ie much younger than in *F. dentata*). Female forages for short period before 2nd brood laid & tended late Spring/early Summer in a new nest.
- In Shropshire seems to be associated with brownfield sites which have had shelter belt/shrub planting ie may be accidentally introduced.

- Length: Head/body 4mm-7mm. Forceps: male 0.75mm-1.25mm; female 0.5mm-1.0mm. **Very small**.
- Note black head & red forceps. Fully winged, with large, clearly visible hind-wingtips. Flies readily & often; may enter moth traps etc.
- Lives within moist heaps of organic matter which generate heat eg compost, horse manure. Continuously brooded & may be found in any life stage at any time of year. Due to habitat, very under-recorded. I therefore reproduce the following: "Dig about 6" into the heap, where it is moist & warm. The earwig... will probably dive into the manure as soon as it is exposed... as soon as you see it dive, grab the manure & put it onto a (white sheet) & then wait for it to crawl out. John Widgery told me of this method & I found my first specimen in the heap... in my own garden within 5 minutes, in spite of my previously searching (it) intermittently for about 20 years" (*Grasshoppers and Crickets of Surrey,* David W. Baldock (Surrey Wildlife Trust, 1999)).