

## A British Naturalists' Association Guide

### **The Overlooked Orthoptera: an introduction to grasshoppers and bush-crickets**

By Dr Tim Gardiner FBNA © September 2008

Essex County Recorder for Orthoptera

People often ask me why I became interested in grasshoppers and crickets (order Orthoptera) and the answer is really simple: because they are the most fascinating of insect groups due to their curious tendency to jump, fly and sing, not all at the same time however! However, my enthusiasm for grasshoppers and crickets has not been shared by naturalists through the ages. For example, the famous Victorian naturalist William Cole suggested in 1905 that:

*“The Crickets and the Grasshoppers must be left to chirp their own praises and there are several species to join in the chorus”*

William was indeed referring to the small number of species to be found in Britain in comparison with larger insect orders such as moths, beetles and flies. However, the low number of species in the UK makes it relatively easy for an amateur naturalist to become an expert identifier in a short space of time (about 2-3 years to become familiar with the widespread species).

Britain has a comparatively low diversity in its orthopteran fauna with just 30 native species, compared with over 600 species in Europe and approximately 18000 species

worldwide. The order Orthoptera is divided into two sub-orders: Ensifera ('crickets') and Caelifera ('grasshoppers'), which have four and two families respectively.

**Families of the two sub-divisions of the order Orthoptera**

<b>Sub-order: Ensifera</b>	<b>Family</b>
Raphidophoridae	Camel-crickets*
Tettigoniidae	Bush-crickets and coneheads
Gryllidae	Crickets
Gryllotalpidae	Mole-crickets
<b>Sub-order: Caelifera</b>	
Tetrigidae	Groundhoppers
Acrididae	Grasshoppers and locusts*

\* = Camel-crickets (Raphidophoridae) and locusts (member of the Acrididae) are not native to Britain  
 Redrawn from Haes & Harding (1997)

I believe that the main families which a naturalist should look out for are the grasshoppers and bush-crickets, as crickets and mole-crickets are comparatively rare in Britain and are unlikely to be encountered. You may come across groundhoppers (smaller versions of grasshoppers) but as these require a nose-to-the-ground searching approach it is unlikely that these will be readily encountered by all but the most enthusiastic (and muddy!) field naturalist.

Grasshoppers and bush-crickets are conspicuous diurnal insects that often occur in large numbers in grassy meadows and adjacent woodland/hedgerow habitats. Similar to all insects, grasshoppers and bush-crickets possess an external skeleton covering the body, which is divided into three sections: head, thorax and abdomen. Grasshoppers have short antennae, whereas bush-crickets have long antennae and this is a key distinguishing feature in the field. Grasshoppers and bush-crickets possess biting mouthparts and a saddle shaped pronotum which covers the thorax and acts as a protective shield. The markings on the pronotum are often critical for identification.

Female grasshoppers and bush-crickets possess an ovipositor with which eggs are laid into the soil, on leaf lamina or in woody vegetation. The ovipositor is often a key way of determining whether you are looking at a grasshopper or a bush-cricket. The female grasshopper has a pair of valves on the abdomen, which are fairly inconspicuous unless close observation of the insect is undertaken. However, female bush-crickets have a long, often sword shaped ovipositor and this is easily seen in the field.

Males stridulate or 'sing' to attract females for mating purposes and each song is characteristic of one species. For those of good hearing it is possible to record grasshoppers and bush-crickets very quickly in the field based on the songs. Grasshopper song is produced by rubbing a row of stridulatory pegs on the inside of the hind femur against the forewings, whereas bush-crickets stridulate by rubbing the forewings over each other.

Grasshoppers and bush-crickets have enlarged hind legs for jumping, although the most normal method of locomotion is walking, jumping only occurring when disturbed. Grasshoppers are herbivorous and tend to feed on grasses in preference to herbs. Most bush-crickets are omnivorous, although woodland dwelling species such as Oak Bush-cricket *Meconema thalassinum* are carnivorous. Bush-crickets that mainly inhabit grasslands such as Roesel's Bush-cricket *Metrioptera roeselii* and Long-winged Conehead *Conocephalus discolor* predominantly feed on grasses.

Most grasshoppers and bush-crickets are univoltine and have only a single generation each year, although some bush-crickets such as the frequently occurring Roesel's

Bush-cricket can display a semivoltine (two year) life cycle. The univoltine life cycle of a common and widespread species, the Meadow Grasshopper *Chorthippus parallelus*, consists of six stages which begin with the oviposition of egg-pods in the soil by the female. These egg-pods can contain approximately 10 to 15 eggs and the Meadow Grasshopper overwinters in this egg stage. In contrast, the egg-pods of Roesel's Bush-cricket are laid into plant stems.

**The life cycle of the Meadow Grasshopper and Roesel's Bush-cricket**

Species / life stage	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Meadow Grasshopper												
Egg	-----										-----	
Nymph				-----								
Adult						-----						
Roesel's Bush-cricket												
Egg	-----										-----	
Nymph					-----							
Adult							-----					

The eggs of the Meadow Grasshopper hatch in late spring or early summer when the temperature is suitable after undergoing a period of diapause in winter when development is arrested. Diapause is dependent upon low winter temperatures and is not terminated by favourable climatic conditions. Once diapause has been completed, the eggs undergo a period of embryonic postdiapause development (PDD) that is regulated by temperature at the soil surface. Therefore, warmer temperatures early in the year (in March-May) may accelerate egg development leading to earlier hatching of grasshoppers. This response to temperature makes grasshoppers and bush-cricket ideal indicators of changing climatic conditions. Some species such as Roesel's Bush-cricket and Long-winged Conehead have dramatically spread their range over the last 30 years in Britain in response to the warmer climate and are now turning up in some quite northern localities.

The nymphs (smaller, wingless versions of adults) of the Meadow Grasshopper take approximately two months to reach maturity, becoming adult from June onwards. Grasshoppers typically have four instars, with the skin being shed at the end of each instar stage to reveal a larger successive instar. Contrastingly, bush-crickets can have between five and six instars.

I hope this article will encourage naturalists to start recording grasshoppers and crickets in the countryside; they are certainly quick to respond to changes in grassland management and climate change making them ideal indicator species. I leave you with a telling statistic; the international society for grasshoppers and crickets (The Orthopterists' Society) has only 330 members!! For further information it is well worth consulting the following book and website: A Photographic Guide to the Grasshoppers and Crickets of Britain and Ireland, by Martin Evans and Roger Edmondson, available from WildGuideUK website (which also has photographs and identification tips: [www.wildguideuk.com/](http://www.wildguideuk.com/)).

**Key differences between grasshoppers and bush-crickets**

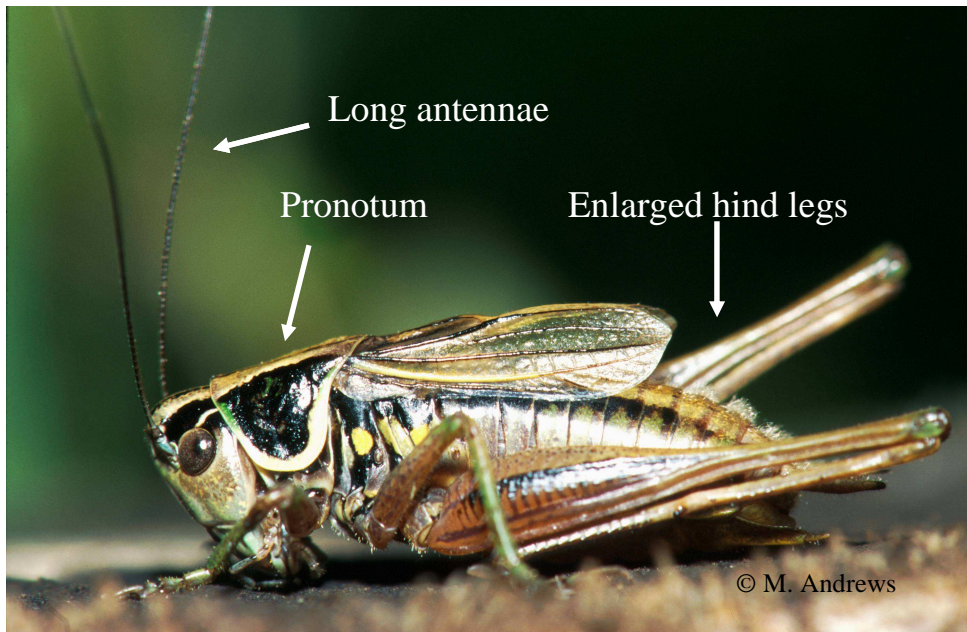
<b>Family</b>	<b>Antennae length</b>	<b>Ovipositor length (female)</b>
Grasshopper	Short	Short
Bush-cricket	Long	Long

Female bush-cricket ovipositor (long, sword shaped), this is absent in female grasshoppers which have an inconspicuous pair of valves at the end of the abdomen

© T. Benton



**Roesel's Bush-cricket, note the antennae which are longer than the body**



**Common Green Grasshopper, note the antennae which are shorter than the body and the pronotum protecting the back of the thorax**

