

The Grasshoppers and Crickets of Rye Harbour

Rye Harbour Fauna and Flora Volume 3

By Chris Bentley

**This report should
print out in booklet
form so that you can
make your own.**

**Print on both sides of
7 sheets of A4 paper.**

**Published by
East Sussex County Council
and
The Friends of Rye Harbour Nature Reserve**

Rye Harbour Nature Reserve
2 Watch Cottages
Winchelsea, East Sussex
TN36 4LU

christopher.bentley@eastsussex.gov.uk

www.WildRye.info

February 2010

Introduction

In 1965 **East Sussex County Council** published a report on the future development of the East Sussex Coast which included proposals to encourage the establishment of a Nature Reserve over the whole of the 728 hectares (c.1,800 acres) of the Rye Harbour Site of Special Scientific Interest (SSSI). In 1970 the shingle beach owned by the Environment Agency was declared a Local Nature Reserve (LNR) by the County Council, who also appointed a Management Committee to administer the LNR. This was the beginning of Rye Harbour Local Nature Reserve. Since then further land has been added by agreement with neighbouring landowners and the County Council and by purchase of land by the **Sussex Wildlife Trust** with the help of the **Friends of Rye Harbour Nature Reserve**. It is hoped that further areas of the SSSI will become part of the Nature Reserve and so this report covers the whole area.

The present extent of the Nature Reserve includes the seaward shingle ridges extending inland to, and including, the gravel pit known as Ternery Pool and the nearby excavation known as the Quarry (Beach Reserve), a large gravel pit (Castle Water), a large area of meadow land and shingle ridges around Camber Castle (Castle Farm) and a small area of saltmarsh fringing the western bank of the River Rother between Rye Harbour and the river mouth.

Access to the Nature Reserve is free, but restricted to the network of footpaths. To avoid disturbance to wildlife all visitors are particularly requested not to enter the sign-posted "Wildlife Sanctuary Areas" or any of the other fenced areas within the Nature Reserve or any of our neighbours' land. There are four bird watching hides which are always open to the public. Rye Harbour has a number of features to allow those with disabilities to better experience the sights and sounds of the reserve. These include wheelchair access to three of the four hides and many of the footpaths, and the presence of induction loop systems for those with hearing problems in two of the hides and at the information centre. The reserve also has several wheelchairs which are available to use by visitors (contact the warden on 01797 227784 for hiring information).

Notes

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Information is available at the Kiosk in the car park and at Lime Kiln Cottage Information Centre where there are information boards, leaflets, reports and

voluntary wardens to help you discover the wildlife of the Nature Reserve. Lime Kiln Cottage is open when volunteers are available.



Grasshoppers and Crickets

Grasshoppers and crickets belong to the order Orthoptera (meaning 'straight wing' from the shape of the front wings). At Rye Harbour, three distinct groups are represented; the bush-crickets (Tettigoniidae), the grasshoppers (Acrididae) and the ground-hoppers (Tetrigidae). In Britain, other groups include the true crickets (Gryllidae) and the mole crickets (Gryllotalpidae, represented by one species).

Life Cycle

The life cycle of grasshoppers and crickets can be split into three stages; egg, nymph and adult. Eggs are laid above or below the ground, either in structures such as plant stems or bark, amongst the bases of vegetation, or among roots or soil. In grasshoppers, the eggs are surrounded by a frothy substance which hardens into a pod, while in ground-hoppers another secretion is used to bind the eggs together. In some groups, such as the bush-crickets, females have a structure called an ovipositor which can be used to insert eggs into stems or bark.

Nymphs are similar to the adult in general structure, differing in smaller size, lack of fully developed genitalia and wings (though older nymphs will have precursors called wing-pads), and sometimes colouration (e.g. Grey Bush Cricket). Growth is achieved through a series of moults, four to ten being needed before the adult stage is reached. Unlike insects such as butterflies and moths there is no pupal (chrysalis) stage, the last nymph stage moulting straight into an adult.

- date - preferably 09 October 1997, but October 1997, autumn 1997, but 1997 or before 1997 can be used.
- your name and anyone else involved in identifying the species.

other information is useful;

- abundance - an exact count, or 1, 10, 100, 1000, or
- DAFOR- dominant, abundant, frequent, occasional, rare.
- sex/stage - male, immature, or flowering, rosette, seeding.
- record type - sighting, dead on road, trapped.....
- associated species - e.g. feeding on leaves of White Willow.
- comment - e.g. seen on road after heavy rain or found under stone.

Please make sure that you keep to public places, or, footpaths, or, that you have the landowner's permission.

Wildlife Recording

The Nature Reserve keeps its wildlife records on a computer database called RECORDER, which enables a large amount of data to be kept safely and accessible. It can produce maps, tables, graphs, summaries and species lists for small areas, or the whole of Rye Bay. The database currently holds 160,000 records of more than 6,000 species.

You can help to add to this information which will help us to protect and manage the wildlife, and assess the populations and distribution of the many rare and endangered species that occur in the area.

What makes a useful record?

A useful record does not need to be of an unusual species, we are lacking a lot of information on the distribution of many common species.

An acceptable wildlife record needs four basic parts;

- the name of the species - please indicate if you are not 100% certain.
- its location - preferably a name and a six figure grid reference e.g. Watch Cottage at TQ928175 .

An unusual feature of both adult grasshoppers and crickets (though not ground-hoppers) is their ability to produce sound. In grasshoppers, this is achieved by rubbing pegs or ridges on the hind femur on the fore-wing (similar to running your thumb along the teeth of a comb), while in the bush-crickets and groups such as the true crickets, a similar effect is achieved by rubbing the bases of the forewings together. This method of sound production is known as 'stridulation', and the sounds produced are used by the male during courtship, each species having a distinctive 'song' which with experience can be used to aid identification. In some species (particularly grasshoppers) both males and females 'sing', though the ability and structures are generally better developed in the male.

In British species, the life-cycle usually takes one year, with the winter season passed as an egg, though some, e.g. Dark Bush-cricket can take up to two years to develop.

Fig. 1. shows the basic structure of a grasshopper. As with all insects

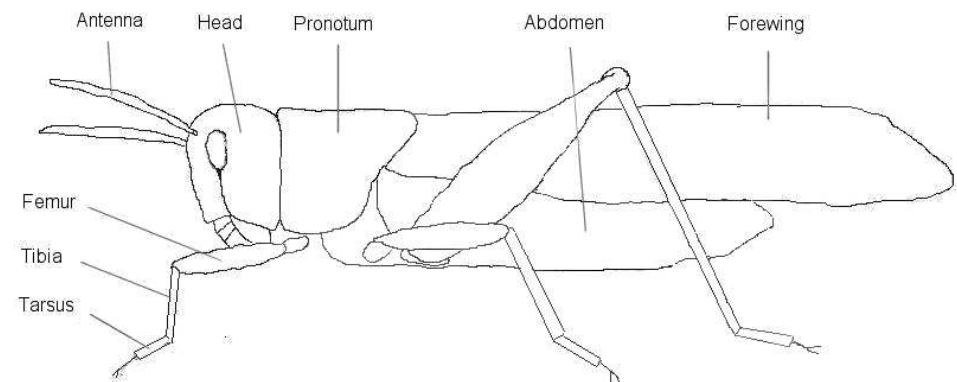


Fig. 1. Diagram showing basic structure of a grasshopper

the body is divided into a head, thorax and abdomen. On the head are the antennae, very long and threadlike in the bush-crickets and shorter and stouter in the grasshoppers and ground-hoppers, the eyes, both the many faceted compound eyes, and smaller simpler structures called ocelli, and the mouthparts. The thorax is the attachment point for two pairs of wings and three pairs of legs, and is covered by a structure called the pronotum which in the groundhoppers extends back to cover the abdomen. The legs themselves have three major segments, femur, tibia and tarsus, and in bush-crickets can also carry a specialised hearing organ. The hind legs are long and powerful and are adapted for jumping, and in grasshoppers also have toughened pegs or ridges which are used in the production of sound. The front pair of wings are toughened and act as a protective covering for the more delicate hind wings and also possess toughened structures used in the production of sound. In some species, e.g. Meadow Grasshopper or Dark Bush-Cricket, both pairs of wings can be reduced. The abdomen has 11 segments ending in a pair structures called cerci, which particularly in the male are used during mating. In addition, female bush-crickets also have an egg-laying structure called the ovipositor which is important for identification in some species, while in grasshoppers, the abdomen also bears the hearing organ.

Identification

A total of 13 species of Orthopteran have been recorded from Rye Harbour, including three ground-hoppers, four grasshoppers and six bush-crickets. In order to assist in the identification of these species, a key is given below. The key works by narrowing down the possible species through a series of questions until an answer is arrived at. In

Slender Ground-Hopper (*Tetrix subulata*)

Identification: Occurring in both long and short-winged forms, this species can be distinguished from Common Ground-hopper by the absence of a pronounced median crest on the pronotum, and from Cepero's Ground-hopper by the straight outline of the mid-femora and the shape of the crest on the hind femur. As with the other ground-hoppers, this species occurs in a wide range of colour forms.

Ecology: Slender Ground-hopper prefers un-shaded undisturbed areas, usually in moist places such as water meadows, fens, on the margins of stream and in wet woodland rides. It is an active species and flies readily in warm weather.

Distribution: In Britain, Slender Ground-hopper is found mainly south of the Wash-Severn line, with its' most northerly site in



north-east Wales. Within its range it can be locally abundant, though it is easily overlooked. There have been few records of this species on the reserve from scattered localities. Earliest date 18th April, latest 10th October.

Common Ground-Hopper (*Tetrix undulata*)

Identification: This is a rather small and inconspicuous grasshopper-like species. The hind wings are much shorter than the pronotum, which does not extend past the hind knees and has a prominent median crest. This latter feature distinguishes this species from short-winged forms of Slender Ground-hopper.

Ecology: This species requires bare ground with low growing vegetation and moss. Within these constraints it is common in both wet and dry habitats, occurring in woodland rides and clearings, on sand dunes and in old quarries.

Distribution: Common Ground-hopper is widespread in Britain,



with records extending north to the Orkneys. It is common, but often overlooked, in the south, becoming less and abundant and increasingly local (and coastal) in the north. There are a few records of this species from scattered

localities around the reserve. Earliest date 7th July, latest 16th September.

each of the numbered sections of the key a series of choices is given, each choice leading to a different numbered section. In most cases, the features used in the key are either based on colour or are visible with the naked eye. Exceptions are the ground-hoppers, and identification of these species can require the use of a x10 lens. Separation of Cepero's Ground-hopper and long-winged forms of Slender Ground-hopper can be particularly problematical and is best left to an expert. In addition, this key may not work with nymphs, particularly where a choice between winged and non-winged is involved, so it is important that you are sure the individual you have is an adult. Very young nymphs can usually be identified by their small size, but larger nymphs can be very much like adults, and even possess precursors of the adult wings called 'wing pads'. These, however, tend to be rather flat and featureless when compared to adult wings.

For instance, say that you had found a largely brown orthopteran with long, threadlike antennae, short wings and a long ovipositor. Section 1 of the key has an option 'Antennae long and thread-like, ovipositor in female obvious, flattened', followed by a number 11 (meaning go to section 11). Now there are 2 choices; colour mainly brown or grey or colour mainly green. Our insect is largely brown so we go to section 12 and from here to section 13, as the wings are shorter than the abdomen. We now have a choice between two species. Roesel's Bush Cricket has pale edging to the pronotum and pale spots and the body behind, while our insect does not, making it Dark Bush-cricket

After making an identification using the key, go to the relevant section for that species and check your specimen against the description given in the text and the photograph.

Key to Grasshoppers, Ground-hoppers and Bush-crickets at Rye Harbour

1. Antennae relatively short and thick, ovipositor short Antennae long and thread like, ovipositor in female obvious, flattened	2. (grasshoppers and ground-hoppers) 11. (Bush Crickets)
2. Pronotum saddle shaped, not extending over abdomen Pronotum extending backwards over abdomen	3. (grasshoppers) 7. (ground-hoppers)
3. Both pairs of wings considerably shorter than abdomen Wings at least as long as abdomen	Meadow Grasshopper 4.
4. Keels of pronotum straight and parallel Keels of pronotum curved or angled	Lesser Marsh Grasshopper 5.
5. Antennae clubbed (i.e. end swollen) Antennae not clubbed	Mottled Grasshopper. 6.
6. Underside of thorax hairy. Bottom edge of forewing with bulge Underside of thorax not hairy	Common Field Grasshopper Meadow Grasshopper
7. Pronotum extending beyond hind knees Pronotum not extending beyond hind knees	8. 9.
8. Mid femur with wavy outline, ridge of hind femur with 'kink' Mid femur almost straight in outline, ridge of hind femur with smooth curve	Cepero's Ground-hopper Slender Ground-hopper
9. Pronotum with a prominent median crest Pronotum without a prominent median crest	Common Ground-hopper Slender Ground-hopper
10. Colour mainly brown or grey Colour mainly green	11. 14.
11. Wings shorter than abdomen Wings at least as long as abdomen	12 13
12. Pronotum with pale edging. Thorax with yellow spots Pronotum without pale edging. No yellow spots	Roesel's Bush Cricket Dark Bush Cricket
13. Pronotum with pale edging. Thorax with yellow spots Pronotum without pale edging. No yellow spots	Roesel's Bush-cricket Grey Bush Cricket
14. Body covered in small brown spots Body not covered in brown spots	Speckled Bush Cricket 15.
15. Hind femora with small black spines underneath Female ovipositor straight Hind femora without black spines. Ovipositor curved	Long-winged Conehead Short-winged Conehead

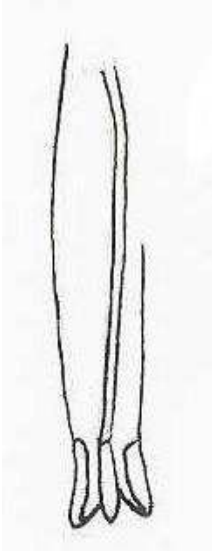
scattering of records from Castle Water/Castle Farm, the shingle ridges around Ternery Pool and the Long Pits. However the small size of all three species means that they have undoubtedly been overlooked to some extent. Earliest date 25th May, latest 10th October.



Fig 4. Mid-tibia of Cepero's Groundhopper



a)



b)

Fig 5. Diagram showing shape of crest on hind femur of a) Cepero's Ground-hopper and b) Slender Ground-hopper

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

Identification: A rather small, slender groundhopper, of variable patterning in brown, grey and black with both pronotum and hind wings extending well beyond the tips of the hind femora. The best identification features (compared to the long-winged form of Slender Ground-hopper) are the shape of the mid-femur, which is wavy in Cepero's (fig 4) and almost straight in Slender, and the shape of the dorsal crest on the hind femur, which when viewed from above and behind, has a 'kink' near the end in Cepero's ground-hopper (fig. 5a) and a smooth curve in Slender (fig 5b). However, separation of this species and the long-winged form of Slender Ground-hopper can be very difficult.

Ecology: Usually found in coastal localities including sand dunes, shingle foreshore, grazing marshes and damp places on cliffs and riverbanks.

Distribution: This is the rarest of the three species of British ground-hopper, being mostly confined to the coasts of southern England and Wales, extending to north Kent and Glamorgan.



While easily the commonest of the three ground-hopper species found at Rye Harbour, this is still a relatively rare species with a

Lesser Marsh Grasshopper (*Chorthippus albomarginatus*)

Identification: A medium-sized grasshopper, of variable coloration but usually predominantly brown or green. The side keels on the thorax/pronotum are straight and parallel (fig. 2a), distinguishing this species from all others found on the reserve, though care must be taken with long-winged forms of Meadow Grasshopper in which these keels are gently incurved.

Ecology: This species occurs both in moist, low-lying grassland in coastal areas and in association with estuaries and tidal flood plains, and on dry grassland on dunes, sea banks, and waste ground.

Distribution: Lesser Marsh Grasshopper has a largely southern and eastern distribution, with a strong coastal bias, and occurs up to the Humber and north Wales. Probably the most commonly met with species of orthopteran on the reserve. Widely distributed, though commonest on the Beach Reserve. Earliest date 25th May, latest 10th October.



Common Field Grasshopper (*Chorthippus brunneus*)

Identification: A variably coloured grasshopper, with green, brown, and sometimes purple forms occurring. In this species, the side keels on the prothorax are sharply angled towards each other (fig. 2b), the underside of the thorax is distinctly hairy, and there is a bulge on the front (bottom) edge of the forewing (fig 3, the costal bulge), a combination of features not found in any other species on the reserve.

Ecology: Common Field Grasshopper occurs in a variety of dry, grassy habitats, though it is seldom found in damp or lush areas. It is often seen sunning itself on walls, paths and bare ground on sunny days, including concreted and asphalted areas in the vicinity of buildings. When egg laying it has a preference for bare, dry and compact soil, often in ant hills. It is a strong flier, particularly during hot weather, and makes short, rapid flights from one area to another.



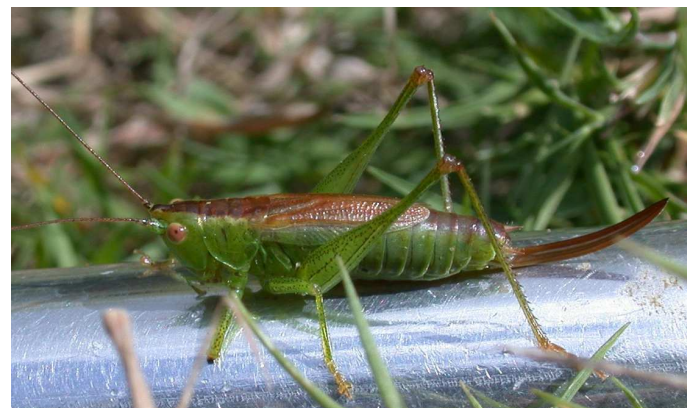
Distribution: This species is generally common over the whole of Britain. At Rye Harbour it occurs in low numbers (though is probably overlooked), with the majority of records from the Beach Reserve. Earliest date 25th May, latest 27th October.

Short-Winged Conehead (*Conocephalus dorsalis*)

Identification: A small brown and green bush cricket. Most likely to be confused with Long-winged Conehead (see under that species for separation). Despite its name, this species can occur in both long and short-winged forms.

Ecology: This species is found amongst rushes, sedges and reeds in wet places. It is particularly frequent in coastal areas, and is often found in the vicinity of saltmarshes. The eggs of this species can survive several months immersion in sea water.

Distribution: This is largely a species of the south and east, though it does occur up to the Humber in the east, and there are



scattered records from the Welsh coast. This species is widely distributed on the reserve, though in small numbers. Confusion is most likely with the previous species, though

Short-winged Conehead is more likely to be met with at Rye Harbour. Occurring from late June to early October. Earliest date 29th June, latest 22nd October.

Long-Winged Conehead (*Conocephalus discolor*)

Identification: A small brown and green bush cricket. Most similar to Short-winged Conehead. Long-winged conehead can be distinguished from the normal (i.e. short-winged form) of this species simply on wing length, but the rarer long-winged form requires more care. Long-winged Conehead usually has a few small black spines on the underside of the hind femora (none in Short-winged), and in addition, females Long-winged Conehead has a straight ovipositor (curved in Short-winged. Compare the photographs of these two species below)

Ecology: This species inhabits areas of long grass, reeds or rushes in wet places, almost always within a few miles of the sea.



Distribution: Long-winged Conehead is confined to the south coastal area, with records from Dorset, Hampshire, Sussex and Kent. A relatively uncommon species on the reserve, with less than ten records from widely scattered localities. Earliest date 18th July, latest 19th September.



a) b) c)
Fig 2. Head and pronotum of a) Lesser Marsh Grasshopper, b) Common Field Grasshopper and c) Meadow Grasshopper showing shape of keels on pronotum

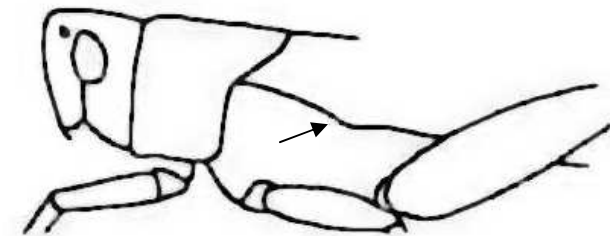


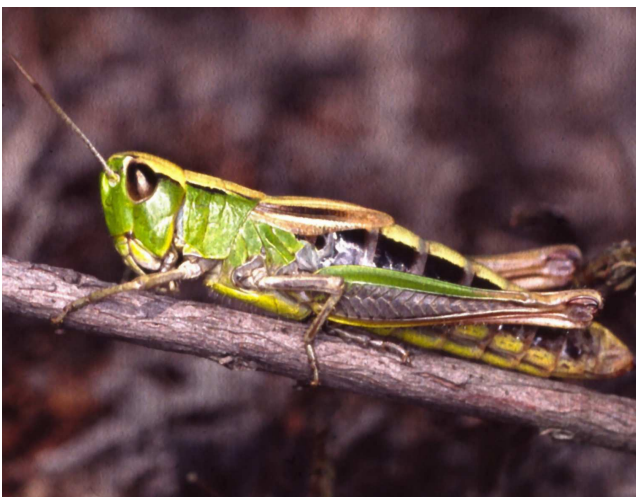
Fig. 3. Common Field Grasshopper showing position of costal bulge (arrowed)

Meadow Grasshopper (*Chorthippus parallelus*)

Identification: A medium-sized grasshopper, occurring in both long and short-winged forms. Colouration is largely brown and/or green, though males have a yellowish green colouring on the abdomen and a brown tip, and adult females may be pinkish purple. The side keels of the pronotum are obviously, but gently incurved (i.e. not as sharply angled as Mottled or Field Grasshopper, fig. 2c)

Ecology: Meadow Grasshopper occurs in a very wide range of grassland habitats, from coastal sand dunes and shingle to wet grassy moorland. It is, however most common in courser rougher grassland, particularly in moister habitats.

Distribution: This species has a wide distribution in Britain, occurring from the south coast to the Orkneys, and is certainly the most common and widespread grasshopper in England. There have been very few records of this species for the reserve, though it has almost certainly been overlooked to some extent. Earliest date 26th July, latest 10th September.



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

Identification: A medium sized bush-cricket, usually brown with yellow markings, though also occurring in green forms. There is a pale margin to the pronotum and pale patches on the body behind, while the underside of the abdomen is yellow. Roesel's Bush-cricket is normally short-winged as an adult, though there is a long-winged form which occurs commonly, particularly during very hot summers.

Ecology: This species is usually found amongst long grassy vegetation, both in moist areas along river estuaries and in drier areas such as roadside verges and chalk downland.

Distribution: Roesel's Bush-cricket has a restricted distribution centred on the Thames estuary, with scattered records along the south and east coasts to Hampshire and the Humber. The first



reserve record was on 23rd August 2005, when a male of the long-winged form was found singing on Castle Farm. There were no more records until 2008 and 2009, when there were regular sightings at the eastern end of the Beach Reserve. Earliest record 23rd July, latest 22nd October.

Dark Bush Cricket (*Pholidoptera griseoaptera*)

Identification: A large bush cricket, the body light to dark brown in colour with yellow to greenish yellow on the underside of the abdomen. The wings are shorter than the abdomen, particularly in the female, where they are reduced to small lobes, and there is no median keel on the pronotum as in Grey Bush-cricket. The ovipositor is long and curves gently upward.

Ecology: Dark Bush-cricket is a species of scrubby habitats where there is plenty of cover, such as wood edges, bramble thickets, hedges and nettle beds.

Distribution: Common in the southeast, where it is probably the most widespread and numerous bush-cricket, but rare or absent from most areas north of the Wash-Severn line. A rare species on the reserve, with most records from the area around the Wood. Earliest date 6th June, latest 9th October.



Mottled Grasshopper (*Myrmeleotettix maculatus*)

Identification: A very variable species occurring in a wide range of colour forms. This is the only species of orthopteran found on the reserve which has clubbed (i.e. swollen) tips to the antennae, though these are less pronounced in the female. The side keels of the prothorax are strongly angled and there is no costal bulge.

Ecology: This species is found in dry places with short turf and a large proportion of bare ground on heathland, moorland (especially in areas which have been burnt), sand dunes and sometimes at the top of beaches. It is, however, usually found in shingle habitats.

Distribution: Mottled Grasshopper is widespread in Britain, occurring as far north as the north coast of Scotland, though it is

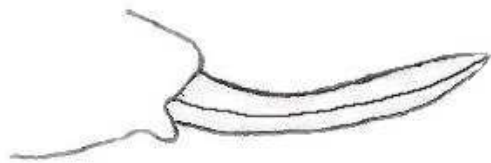


rather local in the north and in the midlands. There are a few records of this species at Rye Harbour, largely from the Beach Reserve and the northern parts of Castle Water, though it has probably been overlooked. It has

also been recorded from the Golf Course and Camber Dunes to the east of the Rother. Earliest date 16th June, latest 13th October.

Grey Bush Cricket (*Platycleis albopunctata*)

Identification: A grey/greyish brown species (though nymphs and newly moulted adults may be green) with no pale band on the pronotum and no green or yellow spots. There is a prominent raised area (keel) on the posterior part of the pronotum and the wings are longer than the abdomen. The ovipositor is quite long and curves upward (above).



Ecology: Grey Bush Cricket is found mainly on hard or soft rock cliffs or shingle in dry places with rough herbage. The species requires very warm condition, especially on south facing slopes, but is rarely found more than a few hundred meters from the coast.

Distribution: This species occurs mainly on the south coast of England, but also a few localities on the west coast north to the



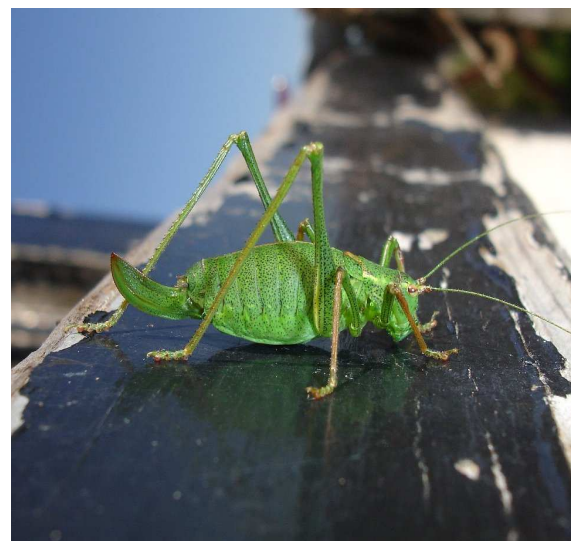
Lleyn peninsula. A relatively uncommon species at Rye Harbour, with records restricted to the eastern end of the Beach Reserve. Earliest date 1st July, latest 22nd October.

Speckled Bush Cricket (*Leptophyes punctatissima*)

Identification: Densely speckled, green bush cricket with reduced fore-wings in both sexes and a very stout, curved ovipositor (see photograph below).

Ecology: Found on low vegetation in woodland edges, scrub, hedges and gardens. Young nymphs of this species can be found on low herbage and shrubs, while older nymphs and adults inhabit the canopy of trees. This reflects changes in food preferences of the different stages, with nymphs feeding on herbs and adults feeding on the leaves of deciduous trees.

Distribution: Common south of Severn-Wash line, but very local



in the Midlands and Wales and absent from northern England and Scotland. A relatively rare species on the reserve, with a few scattered records from Castle Water, Castle Farm and the Beach Field, and it has also been recorded from Rye Harbour Village during 2004. Earliest date 1st June, latest 12th November.