LEICESTERSHIRE ENTOMOLOGICAL SOCIETY

THE WETLAND AND RIPARIAN COLEOPTERA OF THE SOAR VALLEY

1. CARABIDAE

by

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Occasional Publications Series

Number: *5*

Date: *November 1990*

ISSN 0957 - 1019

THE WETLAND AND RIPARIAN COLEOPTERA OF THE SOAR VALLEY. 1. CARABIDAE

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INTRODUCTION

An increase in arable cultivation, coupled with a development of intensive agricultural techniques, has been a major influence on rural wildlife habitats in Leicestershire over the last three decades. Because of frequent flooding and other drainage problems, agricultural improvements have been less evident in the major river valleys in Leicestershire. Consequently, a significant proportion of important remaining wildlife habitats might be expected to occur within these valleys. This is especially true for wetlands. However, large scale river engineering schemes in both the Soar and the Wreake valleys threaten to affect many of these sites. Two important Soar valley marsh sites have already been recently destroyed by other developments.

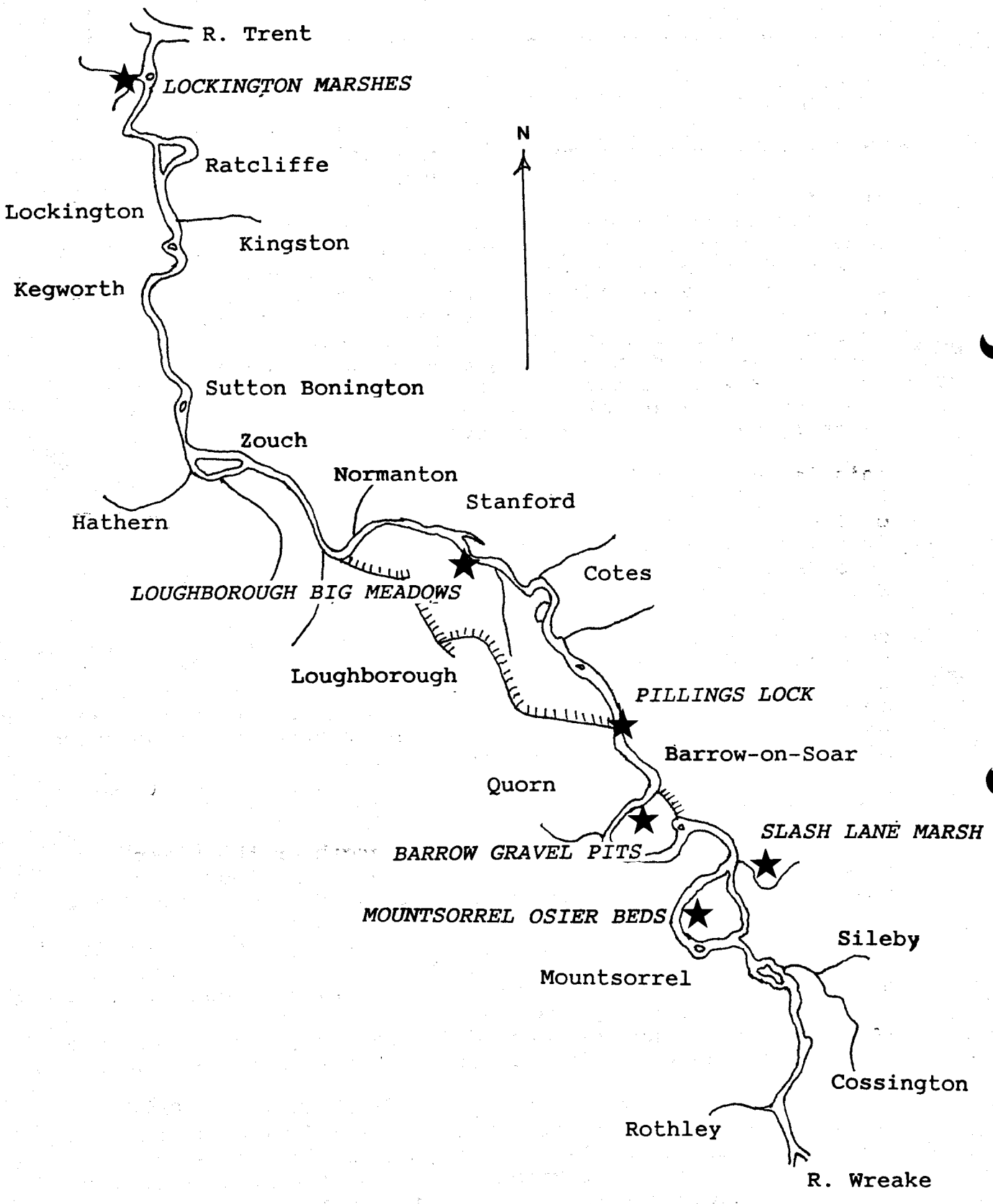
This is the first in a projected series of papers intended to summarise the ecology of those species recorded on a more or less casual basis by the author in the lower Soar valley from 1982 until 1990. A number of manuscript and published records and the results of an invertebrate survey of the river Soar by DG Goddard for the Leicestershire Museums Service (Goddard, undated) have also been incorporated. All records consulted are held on file at the Leicestershire Environmental Records Centre which is based at New Walk Museum, Leicester. It is intended that these papers provide basic information for comparison with future work on the ecology of the valley and enable tentative conclusions to be drawn about the importance of the valley for wildlife conservation.

THE STUDY AREA

The area of study is defined as the length of the river between the confluence of the Wreake with the Soar near Cossington Lock to the confluence of the Soar with the Trent near Red Hill together with the associated flood plain. Figure 1 shows a map including towns and major sites mentioned in the text. The species listed here are those strongly associated with wetland or riparian habitats. Species recorded only from dry grassland or hedgerows within the valley are not generally included even though their presence may be directly or indirectly attributable to the influence of the river.

The river Soar in this stretch is a lowland river meandering through a wide flood plain. The gradient is very small falling 20 metres in 32 kilometres. The larger part of the county of Leicestershire is drained by this stretch of river. As much of the land is covered by clay, rainfall runs off very quickly causing rapid fluctuations in water levels and,

Figure 1. Map of the lower Soar Valley study area



after high rainfall, extensive flooding. The flood plain surface is dominated by silt deposited by the river, a legacy of five thousand years of cultivation in the catchment area. However, significant areas of sandy deposits can be found in the Loughborough area and several gravel and shingle banks were exposed by the collapse of a weir at Cotes in 1987. Otherwise, these types of surface deposits are rare. Below the surface there are extensive beds of sand and gravel and these are sparingly exposed in disused gravel workings at Barrow Gravel Pits, although during the study period they were mainly covered by sallow scrub.

The main riparian habitats studied are bars deposited along the river margins which are colonised by a succession of different types of vegetation as their height increases. Whilst they are still submerged during the winter, bars composed of fine sand or silt are often dominated in the summer by *Glyceria maxima*. As the bar becomes drier *Urtica dioica* becomes dominant.

A variety of wetland habitats occur away from the main river channel. Several sites have been studied. Slash Lane Marsh (SK 588168) is a silt-marsh destroyed in 1987 by drainage. Barrow Gravel Pits SSSI (SK 569169) is an area containing different types of silt-marsh, wet woodland and disused gravel pit pools. A major area of of the silt-marsh area was destroyed by road building in 1990. A small area of carr on a ditch by the river in Quorn (SK 567178) has been intensively studied. Loughborough Big Meadow (SK 541216) a rich flood meadow which contains several pools and wet depressions on sites of abandoned watercourses. Lockington Marshes (SK 491302) is an area of grazed marsh and carr developing along the margins of two creeks entering the river at Red Hill Lock.

ANNOTATED SYSYEMATIC LIST OF CARABIDAE

Eighty seven species of Carabidae have been recorded from the study area. Of these forty eight are here considered to be wetland or riparian species of which two have not been recorded since 1980.

Carabus granulatus L. - no modern records but recorded from hibernation sites in rotten willows.

Blethisa multipunctata L. - no modern records but recorded from the river Soar in the nineteenth century (Bates, undated) and from Loughborough Big Meadow in the 1940s (Henderson, undated); there is a 1986 record from flood refuse by the river Trent at Lockington close to its confluence with the Soar.

Elaphrus cupreus Duftschmid - recorded from silty water margins, Lockington Marshes, Mountsorrel Osier Beds and Slash Lane Marsh.

Elaphrus riparius L. - widespread on silty water margins usually with sparse vegetation.

Loricera pilicornis Fabricius - widespread in a variety of habitats.

Dyschirius aeneus Dejean - recorded from bare silt, Slash Lane Marsh, and a riverside silt bar near Loughborough.

Dyschirius globosus Herbst - no modern records but recorded from the river Soar in the nineteenth century (Bates, undated; Plant, 1844).

Dyschirius luedersi Wagner - recorded at scattered localities from bare silt.

Clivina collaris Herbst - recorded only from sand bar below weir at Barrow Mill (SK 578167).

Clivina fossor L. - widespread in a variety of habitats.

Trechus micros Herbst - widespread but only recorded in flood refuse.

Trechus secalis Paykull - recorded in summer flood refuse at Cossington, Rothley and Sileby.

Bembidion aeneum Germar - widespread and abundant in a variety of damp habitats.

Bembidion articulatum Panzer - recorded at scattered localities on wet sparsley vegetated silt by the water margin.

Bembidion assimile Gyllenhal - recorded amongst marsh vegetation e.g. *Glyceria maxima*, at Barrow Gravel Pits and Slash Lane Marsh.

Bembidion biguttatum Fabricius - widespread in well vegetated water margins; winter hibernation sites include grass tussocks.

Bembidion bruxellense Wesmael - recorded only from sand bar below weir at Barrow Mill (SK 578167) on 20.iv.1985.

Bembidion clarki Dawson - recorded only from the partially shaded, well vegetated margins of a pool in an abandoned watercourse at Loughborough Big Meadow (SK 541217).

Bembidion dentellum Thunberg - widespread on silt substrate with variable development of marsh vegetation; hibernation sites include grass tussocks.

Bembidion genei Kuster - recorded only from water margins at Lockington Marsh and Barrow Gravel Pits, both sites away from the main river channel.

Bembidion gilvipes Sturm - widespread in damp grassland; common in flood refuse; hibernation sites include grass tussocks and, rarely, rotten wood.

Bembidion guttula Fabricius - widespread and abundant in a variety of habitats.

Bembidion harpaloides Serville - widespread often in shaded sites; hibernation sites include rotten wood.

Bembidion lunulatum Fourcroy - widespread mainly on silt by water and in marshes.

Bembidion obtusum Serville - widespread but most records come from flood refuse.

Bembidion properans Stephens - widespread but most records come from flood refuse.

Bembidion punctulatum Drapiez - recorded only from gravel bars at Cotes and the Ratcliffe loop.

Bembidion tetracolum Say - widespread mainly on sand and silt bars but also in marshes away from the main river channel.

Bembidion varium Olivier - recorded only from wet silty water margins in Lockington Marshes.

Pterostichus gracilis Dejean - one specimen recorded from flood refuse, Lockington (SK 4930) on 12.i.1986.

Pterostichus minor Gyllenhal - recorded from well vegetated marshes at Barrow Gravel Pits and Lockington Marshes.

Pterostichus nigrita Paykull agg. - widespread at water margins on a variety of substrates.

Pterostichus strenuus Panzer - widespread and abundant in a variety of habitats but mainly in damp grassland.

Pterostichus vernalis Panzer - widespread in a variety of habitats but mainly in damp grassland.

Agonum albipes Fabricius - widespread on a variety of substrates, exposed or shady, usually close to open water; hibernation sites include grass tussocks and rotten wood.

Agonum assimile Paykull - widespread in wet woodland, even very small areas.

Agonum fuliginosum Panzer - widespread usually in damp areas with well developed marsh vegetation; hibernation sites include grass tussocks and rotten wood.

Agonum livens Gyllenhal - one specimen in rotten stump in hedgerow adjoining Barrow Gravel Pits (SK 568165) on 20.iv.1984.

Agonum marginatum L. - widespread on silt and sand bars along rivers; winter hibernation sites include grass tussocks.

Agonum micans Nicolai - widespread in similar habitats to *A fuliginosum* but tending to favour more shaded sites; hibernation sites include grass tussocks and rotten wood.

Agonum obscurum Herbst - one specimen recorded from flood refuse at Lockington (SK 4930) on 12.i.1986.

Agonum thoreyi Dejean - recorded from well vegetated marshes at Barrow Gravel Pits and Lockington Marshes.

Agonum viduum Panzer - one specimen recorded from a grass tussock in a meadow by Barrow Gravel Pits (SK 567168) on 29.x.1983.

Amara plebeja Gyllenhal - widespread mainly in damp grassland; common in flood refuse.

Trichocellus placidus Gyllenhal - recorded from grass tussocks in damp grassland at Barrow and near Pillings Lock.

Stenolophus mixtus Herbst - recorded only from bare silt at Slash Lane Marsh (SK 588168) on 3.vi.1984.

Chlaenius nigricornis Fabricius - recorded only from silty margin of pool at Barrow Mill (SK 577167); recorded in 1940s from Loughborough Big Meadow (Henderson, undated).

Demetrias atricapillus L. - widespread but mainly recorded from hibernation sites in grass tussocks in grassland.

DISCUSSION

There is a wide variation of habitat preferences shown in the summary above, some of which may be seasonal. The extent of cover provided by vegetation and the nature of the substrate appear to be important for several species. Clearly there is a range of habitats included in the sites which can be characterised by their carabid fauna. It is intended to explore this aspect in future studies.

It is, however, possible to consider the ecological importance of the lower Soar valley wetland sites in comparison with other areas in Leicestershire.

Other river valleys have been less intensively studied than the lower Soar valley and it is not surprising that many species in the above list have not been recorded elsewhere in river valleys. However, a variety of other wetland habitats have been studied outside the Soar valley and some patterns of species distribution are emerging.

Four species, which are widespread in the lower Soar valley, are rarely recorded outside the river valleys in Leicestershire. The first, *Trechus micros*, is difficult to find by normal sampling methods and it is possibly under-recorded elsewhere. *Carabus granulatus, Bembidion gilvipes* and *Agonum micans* are probably more genuinely restricted to river valley sites in Leicestershire. Modern records of *Carabus granulatus* are entirely confined to the lower Soar valley. Modern records of *Bembidion gilvipes* are largely confined to the lower Soar valley but there are isolated records from the river Eye and the Eye Brook. Apart from

the lower Soar valley, *Agonum micans* is common along the valleys of the Wreake and the Eye at least as far as Ham Bridge, Wyfordby. There are also records from the river Welland, Swithland reservoir and a stream valley in Wymeswold. There is an old record from Saddington reservoir but this requires confirmation.

Of the rarer species, *Dyschirius aeneus* and *Clivina collaris* have their only known modern Leicestershire stations in the lower Soar valley. Species mainly confined to the major river valleys in Leicestershire are listed in Table 1.

Table 1. Species of Leicestershire wetland and riparian Carabidae mainly confined to the major river valleys.

Carabus granulatus	*Bembidion gilvipes*
Dyschirius aeneus	*Bembidion punctulatum*
Clivina collaris	*Agonum micans*

Five wetland and riparian species of carabid have been recorded from other rivers but not the Soar. *Asaphidion flavipes* has been found on a bank of the Eye Brook, its only known station in Leicestershire. *Chlaenius vestitus* was found in flood refuse by the river Eye at Melton Mowbray but it is more commonly recorded from disused quarry pools in this area. *Pterostichus diligens* and *Agonum gracile* are recorded from one site each in the Trent valley. *P. diligens* and *A. gracile* are more commonly found away from the major river valleys in fen-like habitats.

Eleven further wetland and riparian species of carabids have been recorded in recent years from other types of wetland sites but not from major river valleys. These are shown in Table 2 together with their preferred habitat. *Blethisa multipunctata,* which has not recently been recorded from the Soar valley, is still found at several reservoir margins although only very rarely.

Table 2. Species of Leicestershire wetland Carabidae recorded from mainly outside major river valleys.

Species of quarry pools	Species of reservoir margins	Species of fen-like habitats
Bembidion femoratum	*Bembidion fumigatum*	*Bembidion mannerheimi*
nitidulum	*doris*	*Pterostichus diligens*
stephensi	*Pterostichus anthrainus*	*Agonum gracile*
	Acupalpus consputus	*moestum*

In addition, several species which are somewhat restricted in their distribution within the valley are widely recorded outside, most notably *Bembidion assimile, Pterostichus minor* and *Agonum thoreyi.*

The Soar valley ground beetle fauna shows a concentration of species, which can be regarded as being rare. Table 3 shows those Soar valley species which have been designated as either locally or nationally notable. Locally notable species are defined as having three or fewer modern recorded sites in the county. Nationally notable species are defined as occurring in 100 or fewer British 10km squares (Ball, 1986). Eight nationally notable species and nine locally notable species, amounting to thirteen species, have been recorded from the study area. Consequently, these notable species constitute 27% of the total wetland and riparian fauna.

Table 3. Notable rare species of Carabidae from the lower Soar valley.

Nationally notable species	Locally notable species
Clivina collaris	*Dyschirius aeneus*
Trechus micros	*Clivina collaris*
Trechus secalis	*Bembidion bruxellense*
Bembidion clarki	*Bembidion punctulatum*
Bembidion gilvipes	*Bembidion varium*
Pterostichus gracilis	*Pterostichus gracilis*
Agonum livens	*Agonum livens*
Chlaenius nigricornis	*Agonum obscurum*
	Chlaenius nigricornis

SUMMARY AND CONCLUSIONS

Forty six species of wetland and riparian Carabidae have been recorded in the study area since 1980 including a high proportion of nationally and locally notable species. Several different habitats are contained within the area and these habitats support different carabid faunas. Comparison of the faunal list with those from other wetland and riparian sites in the county suggests that several types of wetland are not represented in the study area, but that some types of wetland habitat are restricted to river valleys. Consequently, the area of the lower Soar valley is likely to be of major importance for invertebrate conservation in Leicestershire.

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