Staffordshire Tufa Surveys

Focusing on the Acalyptrate Diptera

A report for:
Staffordshire Wildlife Trust

21 January 2020

By:
Conops Entomology Ltd

Report Number: 03.20

Report title:

Staffordshire Tufa Surveys
Focusing on the Acalyptrate Diptera

Report Number: 03.20

By: Andy Jukes BSc (Hons) MCIEEM FRES
andy@conopsentomology.co.uk

Client contact: n.mott@staffs-wildlife.org.uk

Conops Entomology Ltd
Registered Office:
Sharkley Meadow Farm
58, Churnet Valley Road
Kingsley Holt
Staffordshire Moorlands
Staffordshire
ST10 2BQ
Company registered in England and Wales.
Company No. 07505919.
VAT Reg No. 159133995

Contents

1 Introduction

1.1 To undertake a survey of a number of preselected tuferous spring features across Staffordshire to assess their invertebrate potential. The surveys were to target a key group of invertebrates, the acalyptrate Diptera such as craneflies (Tipuloidea), dolyflies (Dolichopodidae), and soldierflies (Stratiomyidae).

The sites

1.2 See Appendix III for site photographs.

Table 1 Sites

Site complex	Sample name	Location	Grid reference	Habitat context
Churnet Valley	Trickle Ridge	Staffordshire Moorlands District. It falls within the Churnet Valley woodlands.	SK0069248260	A large tuferous feature, forming a ridge of tufa through a woodland.
	Emerald Cave	Staffordsahire Moorlands District. It falls within the Churnet Valley woodlands.	SK0050748425	Tufous seepage winthin a woodland. Lush ground vegetation including sedges.
	Dale Sprink	Staffordsahire Moorlands District. It falls within the Churnet Valley woodlands.	SK0008848546	Narrow, linear tuferous seepage running along/within the edge of woodland. Dominated by tall vegetation including meadowsweet.
Himley Hall	The Cressbeds	South Staffordhsire District. The features empty into feeder streams to pools that form a link between Baggeridge Country Park and Himley Hall.	SO8942292185	A series of three stepped pools, formally used as cressbeds. Bordered to the south and east by woodland, open to the north and west. Very disturbed by dogs.
	Island Pool	South Staffordhsire District. The features empty into feeder streams to pools that form	SO8929692118	A tuferous weir, waterfall, and shallow stream course surrounded by woodland.

		a link between Baggeridge Country Park and Himley Hall.		
	Rock Pool	South Staffordhsire District. The features empty into feeder streams to pools that form a link between Baggeridge Country Park and Himley Hall.	SO8908391907	A shallow tuferous stream section surrounded by exposed peat and carr woodland.
Stanton Pastures	Stanton Pastures	East Staffordshire District. Geographically, part of the Staffordshire Moorlands and a series of upland meadows and pastures.	SK1198246962	The tufa feature is situated within a grazed field. The field is predominantly neutral greassland and scrub with low-lying wet flushes including the tufa features.

Methods and timings

Sweep netting

1.3 This method provides the main proportion of the survey element and is the most efficient method of cataloguing a site's invertebrate resource.

Spot sampling

1.4 Spot sampling was employed to collect large, conspicuous invertebrates such as soldierflies and some craneflies from flowering plants and leaves, and to supplement the sweep samples.

Groups recorded

1.5 The principal target group was the acalyptrate Diptera.

Survey timing

1.6 Owing to project contraints, only a single visit could be undertaken to all sites, apart from Stanton Pastures SSSI, which, because of its close proximity to the survyeor's home, was visited on two occasions.

Visits
10 June 2019 – Cloudy, 12–15°C (Staffordshire Moorlands)
21 June 2019 – Sunny, 18°C (Stanton Pastures only)
8 July 2019 – Sunny, 11–18°C (South Staffordhire)
12 July 2019 – Sunny, 18°C (Stanton Pastures only)

2 Results

A total of 108 species were recorded during the surveys, one of which was a species of solitary wasp (*Argogorytes mystaceus*), and another was a snake-fly (*Xanthostigma xanthostigma*), both from Dale Sprink; all others were Diptera.

2.1 A total of nine species recorded have a national status, though a number of these may require a downward revision owing to their recent range expansions and increased knowledge of their habitat requirements and distribution.

2.2 The full list of species recorded for each sample location is provided in Appendix II.

Table 2 Species of importance

Scientific name	Vernacular name	National/local status	Habitat preferences and species notes	Site notes	Staffordshire status (based on SER records)
Clinocera tenella	An Empid fly (Empidoidea)	Nationally Rare; Nationally Threatened	Prefers fast-flowing streams ands waterfalls. It was recorded from the tufa waterfall at the top end of Island pool.	Himley Hall (Island Pool)	First Staffordshire record
Dicranomyia lucida	A Limonidae cranefly	Notable	Associated with carr woodland. Larvae probably develop in saturated mud and leaf litter. Likes lush vegetation.	Dale Sprink; Emerald Cave	First Modern Staffordshire record
Gnophomyia viridipennis	A Limonidae cranefly	Notable	Associated with fens and carr woodland. Larvae develop in the fibrous layer beneath bark of recently felled trees especially poplars (*Populus* spp.).	Himley Hall (Island Pool)	Second Staffordshire record
Hilara merula	An Empid fly (Empidoidea)	Nationally Rare; Nationally Threatened	Prefers flowing water and probably well-vegetated and humid places.	Emerald Cave	First Staffordshire record
Hilara scrobiculata	An Empid fly (Empidoidea)	Locally Rare*; Nationally Scarce	Very little information on the species. Most likely associated with flowing water and lush vegetation, structural complex habitat.	Himley Hall (Island Pool)	First Staffordshire record
Lipaothrix errans	A Limonidae cranefly	Notable; NBERC Act Section 41	A saproxylic specialist on saturated and semi-saturated wood, most	Trickle Ridge	One of very few Staffordshire records

Scientific name	Vernacular name	National/local status	Habitat preferences and species notes	Site notes	Staffordshire status (based on SER records)
			typically in upland headwater streams.		
Lonchoptera nigrociliata	A pointed-winged fly	Locally Rare*; Nationally Scarce	Typically recorded from vegetation along streamsides in woodlands. Probably found in other locations in the Baggeridge to Himley stream and pool corridor.	Himley Hall (Cressbeds)	Second Staffordshire record
Platypalpus macula	A hybotid fly (Empidoidea)	Locally Rare*; Nationally Scarce	A relatively widespread fly but can be locally rare. Found on leaves and trunks of trees.	Himley Hall (Rock Pool)	First Staffordshire record
Thaumastoptera calceata	A Limonidae cranefly	Notable	A seepage specialist of alder carr. Larvae develop in the wet leaf litter.	Dale Sprink	First Staffordshire record

*More common than the status suggests; requires revision.

The most up-to-date information and species reviews are used in the assessment. Where there is no up-to-date review, Pantheon (Webb *et al*., 2017[1]) has been used.

Table 3 Breakdown of species totals for each sample location

Sample location name	Total no. of species recorded	Total no. of scarce species recorded
Churnet Valley	**46**	**4**
Churnet Valley sample – Trickle Ridge	9	1
Churnet Valley sample – Emerald Cave	21	1
Churnet Valley sample – Dale Sprink	26	0
Himley Hall	**50**	**5**
Himley Hall sample – Island Pool	16	3
Himley Hall sample – Rock Pool	31	1
Himley Hall sample – Cressbeds	14	1
Stanton Pastures	**45**	**0**

[1] Webb, J., Heaver, D., Lott, D., Dean, H.J., van Breda, J., Curson, J., Harvey, M., Gurney, M., Roy, D.B., van Breda, A., Drake, M., Alexander, K.N.A. and Foster, G. (2017) *Pantheon – Database Version 3.7.4*. [online] Available at: http://www.brc.ac.uk/pantheon/ [Accessed on 28 May 2017].

Results analysis

2.3 Tables 4–12 have been generated using the Pantheon software package. Pantheon is an analytical tool developed by Natural England and the Centre for Ecology & Hydrology to assist invertebrate nature conservation in England. Site data in the form of species lists can be imported into Pantheon, which then analyses the species within the lists, assigning them to habitats. Pantheon also consigns the most up-to-date national status to the species where it is available.

2.4 Pantheon is also capable of other outputs such as specific assemblage types ('SATs') – see Table 4.

2.5 A SAT is characterized by stenotopic species (those that can withstand only a narrow range of environmental conditions). SATs are therefore more tightly defined than 'habitats' or 'resources' and sit within a parent habitat or broad assemblage type ('BAT'). More than one SAT can sit within a parent BAT.

2.6 Pantheon can also assign habitat scores to applicable species. These have also been produced from the inputted data as an output table.

Example:

BAT: **F**2 – grassland and scrub matrix

SAT: **F**211 – herb-rich dense sward

F212 – dense scrub

2.7 The information obtained from Pantheon can then be used to assign quality to sites and their features, assist in management decisions, and also facilitate requirements for further surveys, where required and appropriate.

2.8 For more information on this new resource, see http://www.brc.ac.uk/pantheon/.

Table 4 Churnet Valley: resource-usage table (taken from Webb *et al.*, 2017)

Broad biotope	Habitat	No. of species	No. of species with conservation status (excluding research-only moths)	Conservation status
tree-associated	shaded woodland floor	31	3	*Dicranomyia lucida* (N); *Lipsothrix errans* (N, S41); *Thaumastoptera calceata* (N)
wetland	running water	20	4	*Hilara merula (NR, NT); Dicranomyia lucida* (N); *Lipsothrix errans* (N, S41); *Thaumastoptera calceata* (N)
tree-associated	wet woodland	17	3	*Dicranomyia lucida* (N); *Lipsothrix errans* (N, S41); *Thaumastoptera calceata* (N)
wetland	wet woodland	17	3	*Dicranomyia lucida* (N); *Lipsothrix errans* (N, S41); *Thaumastoptera calceata* (N)
wetland	peatland	6	–	–
open habitats	tall sward & scrub	5	–	–
wetland	marshland	3	–	–
tree-associated	decaying wood	3	–	–
open habitats	short sward & bare ground	1	–	–

Table 5 Churnet Valley: SAT table (taken from Webb *et al.*, 2017)

Broad biotope	Habitat	SAT	SAT code	No. of associated species	Status
open habitats	–	scrub edge	F001	3	Unfavourable (3 of 11 species)
wetland	running water	seepage	W126	2	Unfavourable (2 of 6 species)
tree-associated	decaying wood	bark & sapwood decay	A212	1	Unfavourable (1 of 19 species)
open habitats	–	scrub-heath & moorland	F003	1	Unfavourable (1 of 9 species)
wetland	peatland	reed-fen & pools	W314	1	Unfavourable (1 of 11 species)

Table 6 Churnet Valley: Habitat scores (taken from Webb *et al.*, 2017)

Habitat	Score	Scoring species
Coarse woody debris	2 obligate xylophage	*Lipsothrix errans* *Lipsothrix remota*
	5 Facultative xylophages	*Austrolimnophila ochracea* *Dicranomyia lucida* *Limonia flavipes* *Limonia macrostigma* *Limonia phragmitidis*
	1 probable xylophage	*Nephratoma quadrifaria*
	1 non-xylophage	*Thaumastoptera calceata*
Exposed Riverine Sediment (Diptera)	1 moderate fidelity	*Hercostomus nanus*
Seepage (acid-neutral)	1 associate	*Tipula maxima*
Seepage (soft rock cliff)	1 associate	*Tipula maxima*
Seepage (woodland)	3 obligates	*Dicranomyia lucida* *Thaumastoptera calceata* *Chrysogaster solstitialis*
	1 specialist	*Dicranomyia fusca*
	2 associates	*Lipsothrix errans* *Tipula maxima*

Table 7 Himley Hall: resource-usage table (taken from Webb *et al.*, 2017)

Broad biotope	Habitat	No. of species	No. of species with conservation status (excluding research-only moths)	Conservation status
tree-associated	shaded woodland floor	22	–	–
wetland	running water	18	3	*Clinocera tenella* (NR, NT); *Hilara scrobiculata* (LR, NS); *Lonchoptera nigrociliata* (LR, NS)
wetland	wet woodland	15	1	*Hilara scrobiculata* (LR, NS)
tree-associated	wet woodland	13	–	–
wetland	peatland	10	1	*Campsicnemus pumilo* (NS)
open habitats	tall sward & scrub	6	1	*Platypalpus macula* (LR, NS)
wetland	marshland	3	–	–
tree-associated	decaying wood	2	1	*Gnophomyia viridipennis* (N)
tree-associated	arboreal	1	1	*Platypalpus macula* (LR, NS)

Table 8 Himley Hall: SAT table (taken from Webb *et al.*, 2017)

Broad biotope	Habitat	SAT	SAT code	No. of associated species	Status
tree-associated	decaying wood	bark & sapwood decay	A212	1 (*Gnophomyia viridipennis*)	Unfavourable
wetland	running water	fast flowing streams & waterfalls	W113	1 (*Clinocera tenella*)	Unfavourable
wetland	running water	stream & river margin	W114	1 (*Lonchoptera nigrociliata*)	Unfavourable

Table 9 Himley Hall: Habitat scores (taken from Webb *et al.*, 2017)

Habitat	Score	Scoring species
Coarse woody debris	1 obligate xylophage	*Lipsothrix remota*
	2 Facultative xylophages	*Austrolimnophila ochracea* *Chrysopilus cristatus*
	1 probable xylophage	*Nephfratoma quadrifaria*
	1 non-xylophage	*Chelifera precabunda*
Exposed Riverine Sediment (Diptera)	1 total fidelity	*Lonchoptera nigrociliata*
	1 moderate fidelity	*Hercostomus nanus*

Table 10 Stanton Pastures: resource-usage table (taken from Webb *et al.*, 2017)

Broad biotope	Habitat	No. of species	No. of species with conservation status (excluding research-only moths)	Conservation status
wetland	peatland	16	–	–
wetland	marshland	13	–	–
tree-associated	shaded woodland floor	11	–	–
wetland	wet woodland	10	–	–
wetland	running water	9	–	–
tree-associated	wet woodland	9	–	–
open habitats	tall sward & scrub	7	–	–
open habitats	short sward & bare ground	1	–	–

Table 11 Stanton Pastures: SAT table (taken from Webb *et al.*, 2017)

Broad biotope	Habitat	SAT	SAT code	No. of associated species	Status
No SATs highlighted					

Table 12 Stanton Pastures: habitat scores (taken from Webb *et al.*, 2017)

Habitat	Score	Scoring species
Acid mire	1 acid mire preferrenial	*Tricyphona immaculata*
Coarse woody debris	1 facultative xylophage	*Chrysopilus cristatus*
	1 probable xylophage	*Tipula fascipennis*
	1 probable/non-xylophage	*Tricyphona immaculata*
Exposed Riverine Sediment (Diptera)	1 moderate fidelity	*Hercostomus nanus*
Seepage (acid-neutral)	1 specialist	*Lejogaster metallina*
Seepage (calcareous)	2 specialists	*Oxycera rara, Melanogaster hirtella*
	1 associate	*Molophilus obscurus*
Seepage (soft rock cliff)	1 specialist	*Oxycera rara*
Seepage (woodland)	1 obligate	*Chrysogaster solstitialis*

3 Discussion

Overview of resource

3.1 The survey produced a total of 108 species, 106 of the targeted Diptera. Within the target group, a number of Diptera specialized in breeding in seepages or other niche features, including coarse woody debris (CWD), were recorded.

3.2 The sampled tufa, however, did not generate a significant list of calcareous seepage-loving Diptera with only two specialist species, *Oxycera rara* (a soldierfly) and *Melanogaster hirtella* (a hoverfly) noted from Stanton Pastures. However, there were a number of other seepage associates noted, including *Dicranomyia lucida* and *Lipsothrix remota* (limonid craneflies), both from the Churnet Valley woodlands.

3.3 The Churnet Valley woodlands produced the strongest list of high-fidelity saturated wood and seepage species including the NERC Act Section 41 limonid *Lipsothrix errans*, whereas Stanton Pastures produced no species with a conservation status.

3.4 Himley Hall had the greatest diversity of species including species associated with running streams and a single species of association with waterfalls, *Clinocera tenella*.

3.5 Given that the sites, other than Stanton Pastures, were sampled on a single occasion, they have generated a significant list of scarce and high-fidelity species. It is suggested that greater survey coverage of other locations and an increased number of survey visits would produce significant lists of high-fieldity CWD and seepage-specialist Diptera.

Site detail

Churnet Valley woodlands

3.6 The Churnet Valley includes a series of humid valley woodlands. A number of these have tuferous influences including the three sample points. It is likely that there are many more seepages present throughout the woodland chain, particularly in the area of Booth's Wood and Dale Sprink (Consall).

3.7 The fauna is diverse and includes a range of specialist Diptera, not only seepage species such as *Dicranomyia lucida* and *Thaumastoptera calceata* but also those associated with other niche woodland features. The most prominent of these is Diptera associated with CWD. The recorded fauna includes the NERC Act Section 41 species of principal importance, *Lipsothrix errans*. This, including other CWD species, highlights the added value of woodland tuferous seepages to Diptera diversity, in that they provide home to calcareous seepage species but also, through saturating fallen deadwood, provide breeding sites for this other, very niche assemblage of flies.

Himley Hall

3.8 Himley Hall possesses a chain of interconnecting woodlands linked by pools and watercourses. The tufa seepages are predominantly present on the eastern slopes of the lower part of the catchment. These spring from woodlands, empty into the watercourses and pools, and have similarities in this respect to the Churnet Valley woodlands. These woodlands also have CWD as part of the niche feature composition, and, since the tufa empties in to a watercourse, other niche features are recorded in the sampling and subsequent analysis, specifically the presence of Exposed Riverine Sediment species such as *Hercostomus nanus* and *Lonchoptera nigrociliata*, which is only the second record of the species for Staffordshire.

3.9 The seepage element is extensive and prominent in places, particularly in Rock Pool and the waterfall out of Island Pool. Despite this, there are no seepage obligates or associates recorded from the surveys. It is, however, suggested that through further surveys, it is likely that these specialists would be recorded.

Stanton Pastures SSSI

3.10 Stanton Pastures differs from the preceeding two locations, in that it is an open site characterized by grassland and marshland with cattle grazing as the primary management activity. The lists include three calcareous seepage specialists including *Oxycera rara*, a colourful soldierfly of seepages and pools. Despite the seepage being highlighted for its calcareous species and also a number of CWD species, none recorded have a nationally significant designation. It is possible that the tufa features and influences are too limited and small to present sufficient niche complexity and availability for some of the more 'fussy' specialists to be present. Further surveys, however, would help elucidate this.

4 Recommendations

- **Further survey**

4.1 Given the limited survey effort afforded to the sample locations, further visits are suggested, including a visit in late June to early July.

4.2 There are many other locations that would also benefit from further surveys, including greater representation from open habtiats.

- **Habitat management**

Churnet Valley

4.3 Trickle Ridge is a delicate feature that requires bespoke interventions to prevent it from being damaged from tree fall and people. The seepage lines that feed the features may also benefit from piecemeal interventions to ensure they do not become obstructed or the course significantly altered.

4.4 Emerald Cave is an equally impressive feature, albeit less obvious, and typical woodland management should be undertaken to ensure it retains its character.

4.5 The seepage line at Dale Sprink is interesting, as it forms an interface between open habitat and woodland edge. Edge features are often rich and varied, and retention of this will only serve to protect the seepage and also provide valuable lekking and foraging areas for the seepage-loving Diptera.

Himley Hall

4.6 Himley Hall has a high footfall, and the lack of diversity within the Cressbeds is testament to this. Other than fencing the feature, there is little that can be done to prevent its further degredation.

4.7 The main watercourse, where the most important seepage lines and feature arise, also suffer from high public pressure. Deadwood hedging and other subtle techniques to divert people away from sensitive areas are recommended. Regular tree management is also required to ensure the watercourse does not become too heavily shaded and enable areas to be partially sunlit. Monitoring and protection of the tufa waterfall are also recommended, as this is a highly valuable feature.

Stanton Pastures

4.8 As the features are small and seemingly unique, close monitoring is suggested to ensure they are not over-poached or grazed.

4.9 Scoping surveys, if not already undertaken, are suggested to attempt to identify other similar feaures in the surrounding field systems.

5 References

Anon. (2008) *Acalypterate Keys*. Unpublished test keys. Dipterists Forum.
Ball, S. (2005) *Hoverfly Recording Scheme*. Available at: www.hoverfly.org.uk
d'Annis Fonseca, E.C.M. (1978) *Diptera Orthorrhapha Brachycera – Dolichopodidae*. Royal Entomological Society of London, London.
Drake, C.M. *et al*. (2007) *NERR005. Surveying Terrestrial and Freshwater Invertebrates for Conservation Evaluation*. Natural England, Peterborough.
Lott, D. *et al*. (2007) *ISIS. Invertebrate Species–Habitat Information System, 2010 Build*. Natural England, Peterborough.
Richards, O.W. (1980) *Scolioidea, Vespoidea and Sphecoidea. Hymenoptera, Aculeata*. Royal Entomological Society, London.
Stubbs, A.E. (2002) *British Hoverflies*. British Entomological and Natural History Society, Reading.
Stubbs, A.E. and Drake, M. (2001) *British Soldierflies and Their Allies*. British Entomological and Natural History Society, Reading.

6 Appendix

Appendix I: Red Data Book definitions
Appendix II: Species lists
Appendix III: Site photographs

Appendix I: Red Data Book definitions

Red Data Book category 1 (RDB 1) – Endangered
Species that are known or believed to occur as only a single population within one 10-km square of the National Grid.

Red Data Book category 2 (RDB 2) – Vulnerable
Species declining throughout their range or in vulnerable habitats.

Red Data Book category 3 (RDB 3) – Rare
Species that are estimated to exist in only 15 or fewer post-1970 10-km squares. This criterion may be relaxed where populations are likely to exist in over 15 10-km squares but occupy small areas of especially vulnerable habitat.

Nationally Notable (Scarce) category A (NS A) – Notable A
Taxa that do not fall within the RDB category but that are nonetheless uncommon in Great Britain and thought to occur in 30 or fewer 10-km squares of the National Grid or, for less well-recorded groups, between eight and 20 vice counties.

Nationally Notable (Scarce) category B (NS B) – Notable B
Taxa that do not fall within the RDB category but that are nonetheless uncommon in Great Britain and thought to occur in 31–100 10-km squares of the National Grid or, for less well-recorded groups, between eight and 20 vice counties.

Nationally Notable (Scarce) (N) – Notable
Species that are estimated to occur within the range of 16–100 10-km squares. The subdividing of this category into Notable A and Notable B has not been attempted for many species in this part of the review.

IUCN categories
EXTINCT (EX)
A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range, have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
CRITICALLY ENDANGERED (CR)
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
ENDANGERED (EN)
A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.
VULNERABLE (VU)
A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.
NEAR THREATENED (NT)
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered, or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
LEAST CONCERN (LC)
A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT
A taxon is Data Deficient (DD) when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. DD is therefore not a category of threat.

GB Rarity Status categories and criteria
Broadly speaking, the Nationally Rare category is equivalent to the Red Data Book, namely Endangered (RDB1), Vulnerable (RDB2), Rare (RDB3), Insufficiently Known (RDBK), and Extinct, which will not be used in this report.
The Nationally Scarce category is directly equivalent to the combined Nationally Notable A (Na) and Nationally Notable B (Nb) categories used in the assessment of various taxonomic groups, e.g. by Hyman and Parsons (1992) in assessing the status of beetles, but never used in a published format to assess these three families.

Nationally Rare Native species recorded from 15 or fewer hectads of the Ordnance Survey National Grid in Great Britain since 31 December 1989 and where there is reasonable confidence that exhaustive recording would not find them in more than 15 hectads. This category includes species that are probably extinct.
Nationally Scarce Native species that are not regarded as Nationally Rare AND have not been recorded from more than 100 hectads of the Ordnance Survey National Grid in Great Britain since 31 December 1989 and where there is reasonable confidence that exhaustive recording would not find them in more than 100 hectads.

England NERC S.41 Biodiversity Lists – England England NERC S.41 Species ‘of principal importance for the purpose of conserving biodiversity’ covered under section 41 (England) of the NERC Act (2006) and therefore need to be taken into consideration by a public body when performing any of its functions with a view to conserving biodiversity. 2008 Natural Environment and Rural Communities Act 2006 – Species of Principal Importance in England (section 41) and Wales (section 42)

Appendix II: Survey results

Only species with a national status have been annotated. All others are common or local species.

Churnet Valley

Scientific name	Genus/family name	National Status (where applicable)
Argogorytes mystaceus	Crabronidae	
Argyra diaphana	Dolichopodidae	
Austrolimnophila ochracea	Limoniidae	
Calliopum aeneum	Lauxaniidae	
Chrysogaster solstitialis	Syrphidae	
Dicranomyia fusca	Limoniidae	
Dicranomyia lucida	Limoniidae	Notable
Dicranomyia mitis	Limoniidae	
Dolichopus campestris	Dolichopodidae	
Dolichopus plumipes	Dolichopodidae	
Dolichopus wahlbergi	Dolichopodidae	
Empis lutea	Empididae	
Empis picipes	Empididae	
Empis praevia	Empididae	
Euphylidorea aperta	Limoniidae	
Hercostomus nanus	Dolichopodidae	
Hilara discoidalis	Empididae	
Hilara merula	Empididae	NR; NT
Hilara thoracica	Empididae	
Limonia flavipes	Limoniidae	
Limonia macrostigma	Limoniidae	
Limonia phragmitidis	Limoniidae	
Lipsothrix errans	Limoniidae	Notable; Section 41 Priority Species
Lipsothrix remota	Limoniidae	
Megaselia fuscinervis	Phoridae	
Meiosimyza rorida	Lauxaniidae	
Minettia longipennis	Lauxaniidae	
Nephrotoma quadrifaria	Tipulidae	
Neuroctena anilis	Dryomyzidae	
Ocydromia glabricula	Hybotidae	
Oedalea stigmatella	Hybotidae	
Parydra coarctata	Ephydridae	
Renocera pallida	Sciomyzidae	
Rhamphomyia crassirostris	Empididae	
Rhamphomyia variabilis	Empididae	

Rhaphium appendiculatum	Dolichopodidae	
Rhaphium caliginosum	Dolichopodidae	
Rhaphium monotrichum	Dolichopodidae	
Scathophaga stercoraria	Scathophagidae	
Sybistroma crinipes	Dolichopodidae	
Tetanocera arrogans	Sciomyzidae	
Tetanocera ferruginea	Sciomyzidae	
Thaumastoptera calceata	Limoniidae	Notable
Tipula luna	Tipulidae	
Tipula maxima	Tipulidae	
Xanthostigma xanthostigma	Raphidiidae	

Himley Hall

Scientific name	Genus/family name	National Status (where applicable)
Anepsiomyia flaviventris	Dolichopodidae	
Argyra diaphana	Dolichopodidae	
Argyra ilonae	Dolichopodidae	
Austrolimnophila ochracea	Limoniidae	
Beris geniculata	Stratiomyidae	
Campsicnemus curvipes	Dolichopodidae	
Campsicnemus pumilio	Dolichopodidae	NS
Chelifera precabunda	Empididae	
Chrysopilus cristatus	Rhagionidae	
Clinocera tenella	Empididae	NR; NT
Dolichopus ungulatus	Dolichopodidae	
Dolichopus wahlbergi	Dolichopodidae	
Ellipteroides lateralis	Limoniidae	
Empis lutea	Empididae	
Gnophomyia viridipennis	Limoniidae	Notable
Hercostomus cupreus	Dolichopodidae	
Hercostomus germanus	Dolichopodidae	
Hercostomus nanus	Dolichopodidae	
Hilara beckeri	Empididae	
Hilara discoidalis	Empididae	
Hilara interstincta	Empididae	
Hilara nigrina	Empididae	
Hilara quadrivittata	Empididae	
Hilara rejecta	Empididae	
Hilara scrobiculata	Empididae	(LR); NS
Hilara thoracica	Empididae	
Lipsothrix remota	Limoniidae	
Lonchoptera nigrociliata	Lonchopteridae	(LR); NS
Minettia longipennis	Lauxaniidae	
Nephrotoma quadrifaria	Tipulidae	
Neuroctena anilis	Dryomyzidae	
Opomyza florum	Opomyzidae	
Opomyza germinationis	Opomyzidae	
Opomyza petrei	Opomyzidae	
Oxycera nigricornis		
Pachygaster atra	Stratiomyidae	
Palloptera quinquemaculata	Pallopteridae	
Parydra coarctata	Ephydridae	
Parydra littoralis	Ephydridae	
Platycheirus albimanus	Syrphidae	

Platypalpus macula	Hybotidae	(LR); NS
Poecilobothrus nobilitatus	Dolichopodidae	
Pseudolimnophila lucorum	Limoniidae	
Pseudolimnophila sepium	Limoniidae	
Renocera pallida	Sciomyzidae	
Rhamphomyia nigripennis	Empididae	
Sybistroma obscurellum	Dolichopodidae	
Sympycnus cirripes	Dolichopodidae	
Syntormon aulicum	Dolichopodidae	

Stanton Pastures SSSI

Scientific name	Genus/family name	National Status (where applicable)
Argyra diaphana	Dolichopodidae	
Bicellaria sulcata	Hybotidae	
Chloromyia formosa	Stratiomyidae	
Chrysogaster solstitialis	Syrphidae	
Chrysopilus cristatus	Rhagionidae	
Chrysotus cilipes	Dolichopodidae	
Chrysotus gramineus	Dolichopodidae	
Dolichopus campestris	Dolichopodidae	
Dolichopus pennatus	Dolichopodidae	
Dolichopus plumipes	Dolichopodidae	
Dolichopus ungulatus	Dolichopodidae	
Empis nuntia	Empididae	
Haematopota pluvialis	Tabanidae	
Hercostomus brevicornis	Dolichopodidae	
Hercostomus germanus	Dolichopodidae	
Hercostomus nanus	Dolichopodidae	
Herina frondescentiae	Ulidiidae	
Herina lugubris	Ulidiidae	
Hilara nigrohirta	Empididae	
Lejogaster metallina	Syrphidae	
Melanogaster hirtella	Syrphidae	
Melanostoma scalare	Syrphidae	
Molophilus obscurus	Limoniidae	
Neoascia tenur	Syrphidae	
Notiphila dorsata	Ephydridae	
Notiphila riparia	Ephydridae	
Oxycera rara	Stratiomyidae	
Palloptera quinquemaculata	Pallopteridae	
Pedicia rivosa	Pediciidae	
Pilaria discicollis	Limoniidae	
Platycheirus granditarsus	Syrphidae	
Pseudolimnophila lucorum	Limoniidae	
Pseudolimnophila sepium	Limoniidae	
Tipula fascipennis	Tipulidae	
Tricyphona immaculata	Pediciidae	
Urophora quadrifasciata	Tephritidae	

Appendix III: Site photographs

Churnet Valley

Photograph 1: Trickle Ridge

Photograph 2: Trickle Ridge

Photograph 3: Tufa waterfall at Island Pool

Photograph 4: Watercourse leading into Rock Pool