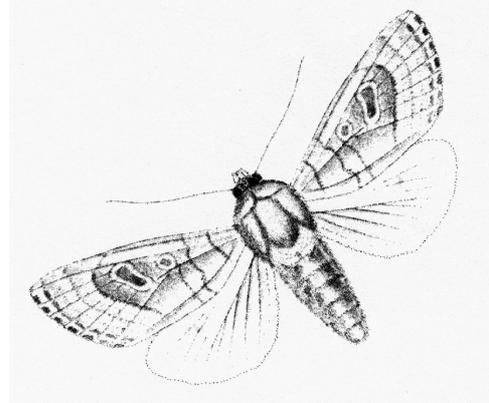


Species Action Plan for Sussex

Marsh Mallow Moth

Hydraecia osseola
hucherardi Mab.



I. Introduction/ Current Status

The marsh mallow moth *Hydraecia osseola hucherardi* Mab. takes its name from the foodplant of its larva, the marsh mallow *Althaea officinalis* L. The early stages of the marsh mallow moth feed solely on the stems, rhizome, and roots, of the marsh mallow. This local plant, has a severely restricted distribution in Sussex, in less than 50 two-kilometre squares (Hall, 1980). This distribution is fragmented and the plant's standing has weakened, its frequency significantly declining during the final quarter of the 20th century (Pratt, 1999). Under almost unique circumstances for a Sussex lepidopteron, the marsh mallow moth's historic and future status is intimately and sensitively associated with the status of this plant. Any serious changes in the marsh mallow plant's standing could therefore be of critical importance, so this plan has a particular focus on botanical research.

I.1 History of the Marsh Mallow Plant

The root of the marsh mallow has been excavated for human consumption for many centuries, for use in confectioneries and for a wide range of medicinal uses. In addition to traditional losses caused by Victorian herbalists and past agricultural practices, it has also always been particularly vulnerable to dyke and river-widening schemes. Despite this, during the late 19th century the plant bloomed in profusion on the banks of ditches at Rye, near Hastings, and between Arundel and Burpham, and less frequently in a number of other places. During the 1930's, the marsh mallow plant was described as being "rather common and locally abundant" in salt marshes and freshwater ditches near the sea (Wolley-Dod, 1937) and by the mid-century it was still generally distributed from Rye to Hythe. This included large expanses very near the town at Rye and at Jury's Gap (Camber). At the time it was even said that, despite losses due to farming, "there is so much on uncultivated ground that there is no danger of it disappearing" (Goodson, 1956). During the mid 1960's the marsh mallow remained plentiful at Rye, but suffered a serious fall in the density of its distribution in many places during the 1970's. There has been a slight recovery since the mid 1990's.

A superficial survey of marsh mallow in the far east of Sussex in 1993 revealed that very few plants still existed in most districts about Rye, although it remained well established in two areas of about 15 square metres each. However, no marsh mallow moths came to my light during that year. A more intensive survey of the marsh mallow plant carried out throughout the same decade shows that several small areas were particularly advantageous at that time - along the banks of the Royal Military Canal to the north-east of Rye town and along those of

the River Brede just to the south, at Northpoint, and around Black House Farm (Rye Bay Wildlife Database).

The marsh mallow is the foodplant of some other interesting invertebrates such as *Aspidapion soror* (a Notable A weevil). This has only been recorded from the Moneypenny Farm area in Sussex. *Pexicopia malvella* (a Notable B micromoth) feeds on marsh mallow and hollyhock, but has not been seen in Sussex since 1970, though it may have been overlooked.

An excellent map of the distribution of the marsh mallow in the far eastern corner of the county has been produced (Rye Bay Wildlife Database), and a good start has been made on a numerical survey of the plant on Romney Marsh (Clancy, 2000 in conjunction with the Romney Marsh Countryside Project, RMCP).

1.2 Biology of the Marsh Mallow Moth

Identification

The marsh mallow moth is a medium to large-sized, cream-coloured moth, variably darkly mottled and shaded, with a wingspan of around 4 cm, and has been well illustrated (Appendix 1).

Life-cycle

The overwintering egg has been described and illustrated in Haggett & Wightman (1956). In the wild, ova are randomly laid on or near the foodplant and in captivity, specifically on the seedheads (Clancy, 2000). Larvae hatch during spring and feed gregariously and exclusively on marsh mallow until about late July, initially on the inner stems and later mainly on the rhizome. Both caterpillars and pupae have been described and illustrated (Appendix 3). Two or three larvae are generally found feeding on each affected rootstock, although five have been noted together. They “are easily found as, when breaking the root, it snaps at its weakest point, i.e. the chamber eaten out by the larva. This is almost always in the crown and just above one of the many tap roots”, although when this part of the plant is eaten the entire length is excavated (Goodson, 1956). Larval borings have also been illustrated (Kettlewell, 1954; pl. 7). Caterpillars generally inhabit the drier roots and, when infected with larvae, the upper leaves on individual plants start to yellow, wither, and droop (illustrated in Kettlewell & Haggett, 1955; pl. 5, fig. 1). These signals may indicate the presence of an attack by marsh mallow moth larvae, although still-luxuriant plants may also have a few caterpillars present.

The pupal stage is spent between one and 2.5 cm under ground close to the rhizome of the marsh mallow and is generally attained around late July. Most moths generally emerge from the pupa between late August and late September, although a few may be seen from mid August or even during the second week of October.

1.3 Distribution of the Marsh Mallow Moth

On the north-western continental mainland, the marsh mallow plant exists in environments situated up to 500 miles inland (Fitter, 1978), but only a few scattered colonies of the moth are known to exist - in France, Greece, Italy, Romania, Russia, Sardinia, and Spain (Waring, in press). In Great Britain the plant is found irregularly in the south within 25 miles of the seashore, along the English coast from the Wash to Dorset, near the Bristol Channel, on the south coast of Wales, and along the south-west coast of Ireland (Perring & Walters, 1976). However, the moth occurs only in the extreme south-eastern corner of England. In Sussex, the plant is found in four main areas, near Chichester, Arundel, in the Cuckmere Valley, and in the eastern-most corner of the county (Hall, 1980).

In Sussex, the marsh mallow moth is currently only known to be well established to the north-east of Rye, near Moneypenny Farm situated within the Walland Marsh (East Guldeford) Site of Special Scientific Interest (SSSI) (see distribution map Appendix 5). Occasional

individuals have also been recorded in several other spots in the Rye area since the mid 1990's, these probably either belong to undiscovered weak colonies or are wandering individuals. Elsewhere in this country there are only three more, known, strong colonies, all in Kent; two on the eastern section of Romney Marsh and another at Burham near Rochester (Clancy, 2001). The typical habitat in which both moth and plant exist comprises open wet locations often associated with sea-water (sometimes historically), such as low-lying and sometimes water-logged fields, and especially on earth banks accompanying dykes, ditches, and slow-running rivers, and in slightly brackish marshes. This habitat on Romney Marsh has been illustrated (Appendix 2). Within breeding colonies, the species often favours the drier parts of the site where the foodplant occurs (Clancy, pers.comm.)

This species of moth is generally restricted to areas where there are accumulations of marsh mallow and from soon after dusk, moths can be easily found, both in flight and at rest, around clumps of the foodplant. It is still often fairly common and occasionally common in its headquarters, but individuals can sometimes be found flying "a couple of hundred yards from the nearest foodplant" (Huggins, 1956). Males fly "fast and erratically and are apt to go high out of reach, or dive into vegetation" (Huggins, 1956), while females exhibit a "heavy, buzzing and low" flight near the larval foodplant and are easier to catch (Haggett & Wightman, 1956). After dark, the moth will come to mercury vapour, actinic, and tungsten light, and fly chiefly for the hour and a half following dusk, with a weaker secondary flight after midnight.

1.4 History of the Marsh Mallow Moth

Detailed historical perspectives can be useful in devising strategies to enhance the future prospects of a species. The most important elements are comparisons of the county's populations over time, the density of distributions within colonised areas, and the true cause of any restrictions or alterations in range.

East Sussex holds a unique place within the British history of this moth, with the country's first records made at Hailsham in 1951 and 1952. A number of subsequent searches for the insect's early and adult stages were made by expert field-workers at Pevensey, from its discovery up until 1999, but it was not recorded in that particular area again. It therefore seems that the marsh mallow moth was just briefly established at Horse Eye Levels. Hailsham is situated on the edge of the comparatively vast Pevensey Levels, and these lands are still an ideal habitat for the marsh mallow plant. However, even during the 19th century, before the levels had started to be drained, the plant was only discovered in two areas, at Horse Eye Levels and Pevensey Marsh (Arnold, 1907). After its apparent very early disappearance from Pevensey Marsh, the marsh mallow has also declined to low levels at Horse Eye Levels. A few miles away, in the Cuckmere Valley, it was abundant during the 1930's through to the 1950's. But here too during recent years the plant has survived in reduced numbers, only seen in any quantity to the north of Exceat, where a search for the marsh mallow moth amongst about 10 square metres of it's foodplant in 1996 also proved negative.

The marsh mallow moth was discovered in the Rye district in 1953 and over the next few years many lepidopterists, collectors and researchers visited the area. Kettlewell and Goodson's fieldwork determined the moth's life history, and proved for the first time that larvae were feeding on the roots of the marsh mallow (Kettlewell, 1954; Goodson, 1955; 1956). During the 1950's the species was detected in a number of fresh localities to the east of Rye. Records include individuals at Camber and Houghton Green, and colonies at the Military Canal, half a mile to the north of Iden Lock, at Church Farm, and in another nearby spot, further away from the river. The moth started to decline from the late 1960's onwards and by the 1970's was found in only three places, near Houghton Green, East Guldeford, and at Rye Harbour. The last sighting at Houghton Green was made in 1985. The site of the foremost

colonies at Rye has been designated an SSSI and most of any potential, but unknown nearby colonies are also likely to be encompassed by SSSIs.

A transect was set up at Moneypenny in 2003 and should be monitored annually if funds allow (Parsons pers. comm.). Survey work on many of the potential Sussex sites is not carried out regularly. However, since 2000, targeted surveys have been conducted annually by contractors on the Romney Marsh settlements in Kent and Sussex, commissioned by Butterfly Conservation under their 'Action for Threatened Moths Project'. Other sites where the foodplant exists were unsuccessfully searched for this moth in 1995 and 1996, including Chichester Harbour, Charleston reedbed in the Cuckmere Valley, at Middle Bridge and Horse Eye on Pevensey Levels (Curson pers.comm.).

In 1994 it was suggested that set-aside policies be explored to enable the establishment of artificial plant colonies in open field situations (Waring, 1994), to give the marsh mallow moth the potential to expand. Since 1999, the RMCP and farmers have established extensive field margins under Defra's Countryside Stewardship Scheme (CSS, now replaced with Environmental Stewardship, ES). The RMCP has been collecting plant seed and co-ordinating their spread on field margins in Kent and Sussex.

It is sometimes suggested that the marsh mallow moth be introduced to flourishing clumps of marsh mallow (Waring, 1994, Clancy, 2000). However, lepidopterous introductions are very rarely successful and, until the main reason for the insect's original decline is known, there is a danger of accidental concomitant introduction of the causal agent.

1.5 Current Status

- Listed as nationally rare in the Red Data Book (RDB 3) (Shirt, 1987)
- Listed in Butterfly Conservation's 'Action for Threatened Moths Project'
- A national Species Statement has been written (UK Biodiversity Group, 1999)
- The moth has also been listed as 'in serious danger of extinction' in Sussex (Pratt, 1999)

Formerly more widespread, although never detected in West Sussex, the marsh mallow moth is currently in serious danger of extinction and is now only well established in the far eastern corner of the county, where a strong colony exists at Moneypenny Farm.

There is little doubt that a natural partial recovery has been taking place since the mid 1990's, especially as single moths have also been seen away from this site. Such sightings have been made at Rye Harbour Nature Reserve (Philpot; in Pratt, 1999, Troake & Brown; in Clancy, 2000 and Brown; in Clancy, 2000), Icklesham (Hunter; in Pratt, 1999), and in the North Point area (Brown; in Clancy, 2000, Clancy; in Clancy, 2000). As previously mentioned, these records probably indicate the presence of undiscovered weak colonies or wandering native colonisers.

This apparent recovery is also exemplified by the recent location of the two Kentish colonies on Romney Marsh at Brookland, found in 1999 (Clancy, 2000); and at Fairfield, found in 2001 (Clancy, 2001). The RMCP also has records from Dungeness, New Romney and Dymchurch.

The marsh mallow moth is one of the key species of interest on the Walland Marsh SSSI and will be one of the Red Data Book invertebrates qualifying the site as Ramsar (English Nature).

2. Current Factors Causing Loss or Decline

While some of the influences that have affected the distribution and strength of individual marsh mallow moth colonies are known, those limiting its local range remain uncertain. Experts do not agree as to whether this moth was a coloniser from the continent in around 1950 or simply a long-overlooked native but, either way, the marsh mallow moth is at the very limit of its northern range here, which means it is particularly vulnerable to natural adverse factors.

Predation

Some of the factors determining the density of this insect's distribution have been established. Quite a number of possible threats have also been listed, including the serious predation of adults by large beetles, for example the dung beetle *Geotrupes spiniger*, and more bizarrely by lizards (Kettlewell, 1954). Larvae are sometimes attacked by parasites, such as *Exephaea occupator* Grav. (Haggett & Wightman, 1956), but such assaults are rare. Although collectors used to be zealous, but there is no evidence that their attentions have been of any consequence in reducing the number of colonies.

Many butterflies, moths and other invertebrates do not have stable populations, but are constantly re-establishing themselves in new areas and dying out in old ones. This may be due, in part, to parasites and predators. There is a danger that when large colonies become well established and ideal for predators, they will suddenly crash and no new smaller colonies will be available to replace them. It would be advantageous to provide or conserve areas of marsh mallow plant in places a little distance from sites where the moth is currently found. As the Rye Harbour NR moth trap demonstrates, females will sometimes wander, but they do need somewhere to go. (Roper pers.comm.)

Possible natural decline of foodplant

One of the most potentially significant factors in the decline of marsh mallow moth has been a serious reduction in the foodplant, since the 1970's. The reason for this reduction is not known, although climate is a potential candidate. Some suspect that the predominance of dry weather since that time may have adversely affected both mallow plant and insect, as water levels fell away from the plant's rootstock. Whether or not the serious reduction in foodplant is entirely responsible for the current rarity of insect colonies is questionable, the moth had disappeared from some banks of marsh mallow near Rye before the plant's recent scarcity.

Water drainage and herbicide spraying of foodplant

It is often thought that the decline of both moth and marsh mallow on the whole of Romney Marsh is due to water drainage and herbicidal spraying by local landowners (Heath & Emmet, 1983; Waring, in press). It is true that, in the past, farmers have destroyed marsh mallow in fields by the occasional use of herbicides, by draining the water, and by clearing foliage from the sides of watercourses and locally serious losses have been caused by river-widening schemes. Even today clearing ditches by dredging and the dumping of the resultant material on the ditch bank continues to be an issue on Romney Marsh (Clancy, 2000).

As part of the National Rivers Authority/EA maintenance programme, mechanical cleaning of the ditches over the last 25 - 30 years has had a significant impact on the marsh mallow plant. The situation is now improving, but between the 1960's and 80's it was unregulated and mirrored the decline in the water vole on the Marsh. (Leyshon, RMCP, pers. comm.)

There is now no targeted herbicide spraying of the plant at Rye, although it certainly remains possible that drift from the annual thistle control spraying that takes place in sheep pasture does cause minor damage to the mallow (Yates pers. comm.). However, research has determined that sprayed plants harbour as many larvae as unsprayed plants (Goodson, 1956).

Grazing of foodplant

Sheep are known to actively seek out and devour the marsh mallow, and currently graze the grass at Rye under a regime developed by English Nature, at an average density of around 720 to 840 per square kilometre (Ministry of Agriculture, Fisheries, & Food). However, sheep have grazed here for centuries, long before the discovery of the marsh mallow moth, in widely varying numbers in both Rye and the county as a whole (Pratt, 1999). According to the local Custom's House entries, during the 1780's and 1790's around 68,000 sheep were counted in the Rye district (Young, 1813), most of which would have been grazing on Romney Marsh. This amounts to about a third of modern-day densities, estimated to be around 200,000 sheep in 2000.

It is thought that repeated sheep attacks on individual plants over several years does cause the death of a marsh mallow (Yates, pers. comm.), but the animal's onslaughts are episodic, apparently increasing when the weather is dry and decreasing when wet. Just how significant leaf-eating by sheep really is on the life of such a large rootstock situated below ground level, and at a vice-county-wide perspective over time, is still uncertain. Cattle also graze the marsh mallow (Clancy, 2000; RMCP).

Serious damage to one of the Romney Marsh colonies occurred in 2003 when cattle were allowed access to the main colony field at Brookland throughout the summer. This resulted in the almost total loss of the marsh mallow plants above ground through a combination of trampling and grazing. Whilst it is hoped this extensive bed of the foodplant will recover, it is likely that the majority of the moths that emerged at this site will have dispersed due to a lack of resting and oviposition sites. Although measures are now in place to prevent such a disaster in the future, it is probable that it will take a number of seasons for the marsh mallow moth to return to former levels (Clancy, 2003). In 2004, although further cattle incursion was prevented by the erection of a stock fence, the prolonged grazing and trampling of the marsh mallow plant that occurred in 2003 had caused serious fragmentation and reduction of the foodplant beds (Clancy 2004).

Plant competition

Competition from other plants can impinge upon the potential numerical levels of the marsh mallow. Willow trees and scrub overshadow the plant, and reeds and rushes crowd it out, but their clearances as part of conservation management regimes now controls the problem so far as the few individual marsh mallow moth colonies are concerned.

The damage caused by cattle in 2003 at the Brookland colony allowed the invasion of other plant species, particularly *Scirpus* spp., into large parts of the colony. This not only had a detrimental effect on marsh mallow frequency but also reduced the effectiveness of nocturnal transect monitoring of the marsh mallow moth (Clancy, 2004).

The precise causes of the territorial retreat of the plant that took place during the 1970's and 1980's, and the partial recovery since the mid 1990's, are not known, so it must be acknowledged that the main threats to the marsh mallow moth are also open to question. This serious decline and current partial recovery has been synchronous in both the moth and its foodplant and the association between these two organisms is unusually sensitive so far as the insect is concerned. It is therefore imperative that any change in the status of either moth or plant is recorded and good baseline data established for comparative analysis both now and in the future.

3. National Species Action Plan

There is currently no National Species Action Plan for marsh mallow moth. However, there is a National Species Statement that includes the objective: to maintain existing populations of the marsh mallow moth.

4. Current Action

Annual monitoring has been carried out since 2000 by Sean Clancy (in consultation with RMCP), at all colony sites on Romney Marsh. This has been commissioned by Butterfly Conservation, with contributory funding from EN. The colony at Moneypenny was included in the annual survey programme for the first time in 2003.

This includes:

- the monitoring of established torchlight transects throughout the flight period for the adults
- recording the size, distribution and density of foodplant stands at colony sites
- searches of suitable habitat for new populations

In Sussex, a recording transect was established in 2003 at Moneypenny as part of the above programme to monitor population levels annually at this site. Monitoring for the species is carried out nightly at Rye Harbour. Other areas of foodplant in the Rye area are checked sporadically as part of the monitoring programme.

There are also efforts to propagate the plant (RMCP report 2004).

5. Objectives

1. To improve our knowledge of the current status of the marsh mallow moth and marsh mallow plant in Sussex.
2. To ensure there is no decline in populations of marsh mallow moth and marsh mallow plant.
3. To improve the status of both the marsh mallow moth and marsh mallow plant in the Rye Bay area.

6. Targets

This Species Action Plan has now been archived

7. Potential

It may not be possible to improve upon the political status, high profile and designations that the marsh mallow moth has attained.

- Landowners should be kept informed of the current status of the marsh mallow moth
- Should new colonies of the moth be discovered, the relevant landowners should be re-contacted to ensure they are aware of the importance of the moth and its foodplant
- Management agreements, such as on SSSIs and under Defra's ES, can provide the potential for new population sites.

These may include:

- Measures to encourage marsh mallow growing on set aside land, field margins or in fields, for example through the removal of grazing pressure on fields during the summer
- Appropriate management of ditch sides and scrub
- Fencing areas of marsh mallow plant to exclude livestock

8. Action Plan

This Species Action Plan has now been archived

9. Monitoring/Review

This action plan will be monitored and reviewed on a five-yearly basis.

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11. Consultation

The following organisations and individuals were consulted in the preparation of this Species Action Plan:

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- Brighton and Hove City Council: www.brighton-hove.gov.uk
- Butterfly Conservation (BC) : www.butterfly-conservation.org
- Country Land and Business Association (CLA) : www.cla.org.uk
- Department for Environment Food and Rural Affairs (Defra) : www.defra.gov.uk
- East Sussex County Council (ESCC) : www.eastsussexcc.gov.uk
- English Nature (EN) : www.english-nature.org.uk
- Environment Agency (EA) : www.environment-agency.gov.uk (lead)
- Farming and Wildlife Advisory Group (FWAG) : www.fwag.org.uk
- National Farmers Union (NFU) : www.nfu.org.uk
- Romney Marsh Countryside Project (RMCP) : www.rmcp.co.uk
- Royal Society for the Protection of Birds (RSPB) : www.rspb.org.uk
- Sussex Biodiversity Partnership (SBP) : www.biodiversitysussex.org
- Sussex Biodiversity Record Centre (SxBRC) : www.sxbrc.org.uk
- Sussex Downs Conservation Board (SDCB) : www.vic.org.uk
- Sussex Moth Group (SMG) : www.sussexmoths.org.uk
- Sussex Wildlife Trust (SWT) : www.sussexwt.org.uk
- West Sussex County Council (WSCC) : www.westsussex.gov.uk
- R. Bell, D. C. G. Brown, D. Burrows, S.P. Clancy, R. Cooke, S. Curson, I.Hunter, M. S. Parsons, P. Troake, P. Waring, B. Yates and P. Roper.

12. Appendices

Appendix I: Illustrations of the adult marsh mallow moth

South, 1961; pl. 109, fig. 9 (colour)

Pratt, 1981; pl. 1, fig. 9 (colour)

Heath & Emmet, 1983; pl. 8, figs. 29 & 30 (colour)
 Skinner, 1984; pl. 39, fig. 1 (colour)
 Waring, Townsend & Lewington 2003; p330 (colour)

Appendix 2: Illustrations of marsh mallow habitat

Kettlewell, 1954 (monochrome)
 Goodson, 1955 (monochrome)
Butterfly Conservation, 2000 (colour)

Appendix 3: Illustrations of caterpillar and pupae of the marsh mallow moth

Kettlewell & Haggett, 1955; pl. 4, figs. 1 to 6 & pl. 5, fig. 2 (monochrome)
 Haggett, 1961 & 1981; pl. 11, figs. 1 to 3 (monochrome)
 Porter, 1997; pl. 43, fig. O (colour)

Appendix 4: Acknowledgements

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Appendix 5: Map of the Sussex distribution of the marsh mallow moth

Map showing Marsh Mallow Moth records in Sussex (1994 - 2000)
 Produced by the Sussex Biodiversity Record Centre 07/07/04

