

## THE DUKE OF BURGUNDY: ECOLOGY AND MANAGEMENT AT DEAN HILL PARK

### Description

The Duke of Burgundy is the only metalmark (Riodinidae) in Europe and both sexes are similar although the females tend to be slightly larger and brighter. The species has an intricate wing pattern with the upper wings a rich brown studded with inward facing orange buff spots. The under wings have a red brown colour with dark spots on the forewing and white spots on the hind wing. Both upper and under wings have a chequered fringe.



### Conservation Status

The species has been classified as threatened on a European level due to declines across its range. The species has also suffered declines in the UK since the 1950s and as a result is now a UK BAP Species of Conservation Concern and has recently become a candidate Priority BAP species. The species is also listed under Schedule 5 of the Wildlife and Countryside Act which protects it from sale only. However despite these measures the species is still suffering declines across the country. It is estimated that there are between 100-200 colonies left in central southern England with some isolated in south Cumbria and the north Yorkshire Moors. Due to this decline Dean Hill has been identified as a key area for Lepidoptera in the Butterfly Conservation South Central Action Regional Plan. Within this action plan Duke of Burgundy and another spring butterfly Grizzled Skipper have been identified as priority species.

### Ecology

The Duke of Burgundy is a single brooded species that flies from early May to mid June with peak numbers occurring around the third or fourth week of May although woodland colonies tend to emerge about three weeks later. In the South Downs the species regularly emerges in late April. The species form small close-knit colonies of around 20 adults at the peak flight time, with the males the most conspicuous as they spend much of their time perching and defending their territories. These territories tend to be at the base of hills, especially on the edges of sun-drenched shrubs and the best areas (leks) can be occupied by a number of males and despite much aerial combat there is no evidence of displacement by the victor.

The females are less conspicuous despite being more active than the males and are usually only seen when egg-laying, as a result there is only limited information on their behaviour. Females have been known to move considerable distances and regular sightings away from suitable habitat indicate that they disperse more than the males. Females are mated soon after emergence and tend to only mate once. The



resulting eggs are laid on the underside of the leaves of the larval food plants Cowslip (*Primula veris*) and Primrose (*Primula vulgaris*) in groups of up to eight. When laying the female will favour those plants with large lush leaves that are semi shaded and will avoid those that are in open patches of turf with tight rosettes of small leaves or plants that are heavily shaded with lank leaves.

The eggs hatch within one to three weeks after being laid, depending on the weather, after which the caterpillar rests during the day at the base of the plant and emerge at night to feed but only in fine weather. The caterpillars tend to favour green leaves and will wander away from more exposed plants before the leaves begin to wither, wandering up to several metres. *Primula* seedlings that are hidden beneath the sward are a very important food source for the caterpillars while wandering between plants. After feeding for six weeks between late May and early August the larvae pupate in a hairy speckled chrysalis in dense grass tussocks and over winter in this manner. They will then pupate from mid July to early August.

### Habitat

The Duke of Burgundy favours woodland clearings and chalk or limestone grassland although it is the latter that has the greater number of colonies with the number found in woodland in the UK now less than twenty. In woodland sites the species requires partially open areas such as 2-3 year old coppice, wide grassy rides and glades or recently felled areas. East-west rides are thought to be the most suitable, especially where vegetation is lush due to damper conditions. Within woodlands the species also tends to favour Primrose as its larval food plant particularly where it is partially shaded.



On grassland sites the species tends to favour north and west facing slopes as these tend to be cooler and more humid allowing for lush swards with Cowslip, which is generally favoured on grassland. The species also requires a sward of medium height (5-20cm) for successful breeding as well as areas of scrub or scrub edges to provide areas in which the males can establish territories. The species has been known to colonise south facing slopes although scrub has been essential in these cases to provide the shelter and moisture required for suitable larval plants and thus successful breeding.



## Survey and Monitoring

There are a number of techniques that can be used to survey for Duke of Burgundy that can be used individually or in combination. The first is using timed counts, which involves walking in a zig zag pattern across an area for a set length of time (usually 30 minutes). This provides data that can be used to estimate the flight area of colonies in the area. This is best used for smaller sites, for larger sites a number of different transects should be used. This involves walking a set route on different parts of a site, which can also be timed. This method is very useful for monitoring purposes as the same route can be walked on each occasion. For both of these the weather conditions need to be favourable (warm and sunny) to be accurate.

The remaining methods are more indirect and don't depend on weather to be successful. The first are the use of egg counts where suitable food plants are examined for the presence of eggs on the underside of the leaves. Again this can be restricted with time or can be restricted to a certain area within a site which is most



suitable for egg laying. The last method is the looking for larval damage on the food plants. This damage is very distinctive as it looks peppered due the number of small holes that have been eaten into the leaf flesh while the midrib and main veins are left intact. It can be distinguished from snail or slug damage by the fact that the veins are left in tact and this damage can be seen from July throughout the rest of the summer although there have been instances of this being seen during the winter.



## Management for Duke of Burgundy at Dean Hill

Duke of Burgundy has been regularly recorded at Dean Hill for many years. The western and eastern extent of the blast banks and tunnel entrances support the greatest numbers and the highest single count in 2005 was 11 and in 2006 it was 6. The blast banks support herb-rich chalk grassland, including an abundance of cowslips. A previous survey indicated this was National Vegetation Classification type CG2 (*Festuca ovina* - *Helictichon pratensis* grassland) and CG6 (*Helictichon pubescens* grassland), which confirms it is species rich. The topography of the blast banks and tunnel entrances are ideal for Duke of Burgundy to secure sheltered locations from which to defend territories, mate or egg lay.

The principle form of management on the blast banks in recent years has been a programme of rotational cutting, which is intended to prevent scrub encroachment and maintain plant diversity. The very thin chalk soils help maintain an open sward.

In the absence of grazing it is recommended that this practice of rotational cutting continues by cutting one third of the south side and top of the blast banks each year. Any regenerating scrub such as dogwood should also be cut. If this is done every three years there will be no need to remove arisings. The retention of some small pockets of mature scrub is desirable as this provides the ideal micro-habitat for Duke of Burgundy. Any cutting on the blast banks should take place between October and February to permit all flowering plants to set seed and avoid disturbance to nesting birds. The steep slopes mean that clearing saws (strimmers with heavy duty heads) are ideal for this operation. Any machinery should avoid damaging the ground.

There is an abundance of mature scrub on the north slope of the blast banks, which has not been managed in the past. This scrub serves as important habitat for many breeding birds such as stonechat and whitethroat and it is recommended that at least some of this scrub is retained. A combination of aspect, scrub cover and previous management makes the north facing slope less valuable for insects, including Duke of Burgundy, particularly in spring.

The grasslands that surround the tunnel entrances are within the SSSI and they too support an abundance of cowslip and associated Duke of Burgundy. When the MOD site was operational these areas were cut continuously to prevent long grass posing a fire risk. This continuous cutting combined with the very thin chalk soils has resulted in species-rich grassland. However, there is now an abundance of dogwood scrub in places, which now threatens to spread rapidly. The continuous cutting undertaken by MOD staff served to encourage the spread of the dogwood, as it was essentially being coppiced and a strong rootstock developed. The scrub in these areas can only be controlled by chemical treatment and/or some form of grazing. There is a pressing need to undertake some dogwood control if these habitats are to support Duke of Burgundy in the long term.

The other grassland habitats within the SSSI also have potential to support Duke of Burgundy and other scarce invertebrates. At the eastern end of the site there is a large stand of Juniper within sheltered grassland and this could become ideal habitat for Dukes. The grassland here is regenerating following the removal of a large number of Corsican pine, yew and beech. Some form of grazing would be the ideal management to encourage a diverse sward to develop. There is already an abundance of *Brachypodium pinnatum*, which can develop into large stands at the expense of other herbs. Grazing is the only form of management that can reduce the *Brachypodium* component in the sward. The ideal time to graze is some time between September and March. In the absence of grazing the grassland, including any regenerating scrub should be cut once a year after September.

### Summary

The Duke of Burgundy is under threat and has been lost from a number of regions across the country. Central southern England now forms the core of its range and Dean Hill has been identified by the MOD and Butterfly Conservation as an important site for this species. The species is likely to be listed as a UK Biodiversity Action Plan species when this list is revised shortly. The Duke forms small close knit colonies with the males the most obvious as they defend their territories while the females are only really seen when egg laying. The species favours partially sheltered areas with

an abundance of the larval foodplant, cowslip. There are a number of methods that can be utilised to survey and monitor the species from which the appropriate management can be determined to prevent further losses in the UK.

**Actions to benefit Duke of Burgundy at Dean Hill:**

- In absence of grazing continue rotational cutting on blast banks by cutting one third (south and top only) each year. Some pockets of mature scrub should be retained.
- Control regenerating dogwood scrub around tunnel entrances through chemical treatment of scrub using a triclopyr based product (e.g. Garlon). This area is within the SSSI so formal consent is required for EN for this work.
- Assess the feasibility of reintroducing livestock (cattle or sheep) to graze the blast banks, tunnel entrances and Juniper grassland. No grazing should take place between April – September. Careful consideration should be given to stocking rates and the timing of grazing.
- In the absence of grazing continue to cut the Juniper grassland once a year. This area is within the SSSI so formal consent is required for EN for this work.
- Ensure continued monitoring of Duke of Burgundy at the site each year to inform the management regime.