

# DUSKY LARGE BLUE



The Dusky Large Blue (*Maculinea nausithous*) has characteristic chocolate-brown underwings with a single row of dark spots. The species inhabits extensively used moist mesophile grasslands, tall herb communities, water-fringe vegetation and wet meadows. It is listed in Appendix II and IV of the Habitats Directive. In Southern Germany and especially in Bavaria, high abundance of populations of this species can still be found. Nevertheless *M. nausithous* is regarded as a threatened species in Bavaria and listed as a species of nature conservation concern.

## “Smell my perfume!”

There are two Key Factors for populations of the Dusky Large Blue:

- 1) The occurrence of the host plant *Sanguisorba officinalis*, which is exclusively used by the females to lay eggs in the buds by the first instar larvae for their development.
- 2) A sufficient density of host ant nests, where the caterpillars spend the rest of their development. In most cases *Myrmica rubra* is the main host ant species for *M. nausithous*.

The caterpillar is capable to synthesize host ant specific pheromones. This “perfume” manipulates the host ants to treat the caterpillar like their own brood.

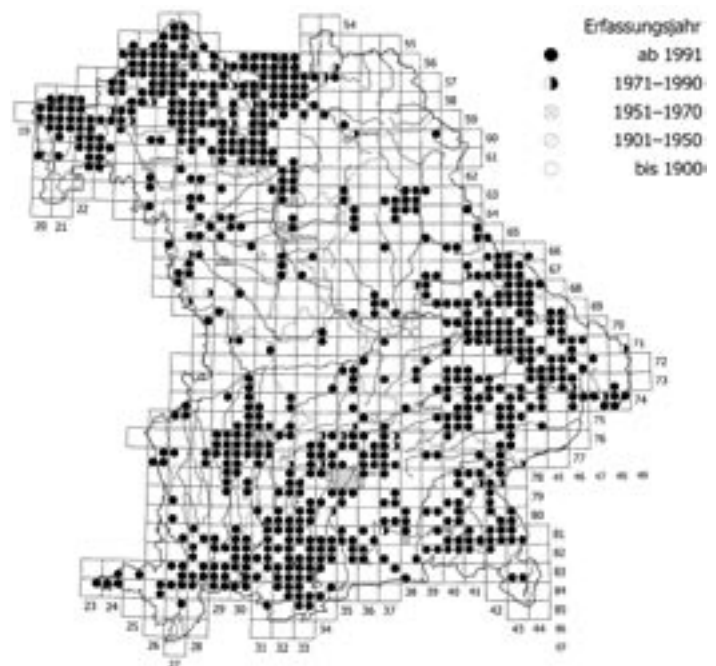
## Pass or Fail –

### The importance of land use systems

As a typical species of open grasslands, the Dusky Large Blue depends on traditional land use systems. In most cases these are extensive mowing regimes, while grazing

plays only a very marginal role in Bavaria. Crucial factors for this species are to find the right date and frequency of mowing, which can differ considerably between regions and habitats. The best way to manage this species and their habitats is complex and not well known amongst nature conservationists. If mowing takes place too late in spring, the females cannot find appropriate flower buds to lay their eggs. If mowing takes place too early in summer most larvae will be destroyed with the cutting of the host plants.

It is important to find answers for all this questions. Thus the Bavarian Academy for Nature Conservation and Landscape management (ANL) started a research project about the impact of land use systems on *M. nausithous*. Later on our investigations were integrated in the EU research project “MacMan” (EVK2-CT-2001-00126), where we found a lot of support for our work.



Distribution of the Dusky Large Blue in Bavaria (Source: Artenschutzkartierung Bayern und Datenbank der ABE, Date: 05.2007)

## Tell me when!

Enclosures around the buds after egg laying, revealed an overall development time range of about three weeks in the buds. Thus a minimum period of three weeks is a major determining factor of the successful development and survival rate of larvae in the buds.

**Important for the timing are the considerable variations of the flight period in Bavaria:**

In the southern parts of the pre-alpine area we found populations of “early fliers”, which appear from mid-June. In these areas, mowing can take place already in mid-August. For these populations land use systems with mowing twice a year (spring and summer) are probably not suitable.

However, in most regions of Bavaria the butterflies appear from mid-July onwards. Accordingly mowing should not take place before mid-September, to reduce mowing induced losses of larvae. An exception are abundant populations, which can cope with a certain loss of larvae and tolerate mowing in the beginning of September.

## Tell me how!

Investigations of ant nests revealed that in Bavaria *Myrmica rubra* is the most important host ant species. In 81 research areas (spread over the whole of Bavaria) we conducted baiting experiments with sugar cubes, to estimate the adoption probability for caterpillars by host ants. Additionally we assessed the vegetation structure and their potential impact on the host ant species. In specific management experiments we also tested the impact of the different mowing regimes on the vegetation and host ants.

**Our results show, that the frequency of mowing should be adjusted according to the productivity and vegeta-**

**tion structure of the habitat. Furthermore this method can be used to meet the specific habitat needs of the host ants.**



Caterpillar in a host ant nest

Based on these results we developed management guidelines for the different habitat types of *M. nausithous* in Bavaria, which are displayed in the chart below. It should be stressed that these guidelines need some minor adjustments if the requirements of other important species have to be considered.

Further information and detailed results of our research project can be found in STETTNER et al. (in prep.) and VÖLKL et al. (in prep.).

Type of Vegetation	Management guideline (prealpine region)	Management guideline (most of Bavaria)
Litter meadow ( <i>Molinion</i> ), <b>low</b> productivity.	One cut every second year, at the beginning of September	One cut every second year, around mid-September
Litter meadow ( <i>Molinion</i> ), <b>moderate</b> productivity	One cut every year, at the beginning of September	One cut every year, around mid-September
Moist grassland ( <i>Calthion</i> ), <b>low up to moderate</b> productivity.	One cut every year, at the beginning of September	One cut every year, between end of may until end of June or around mid-September
Moist grassland ( <i>Calthion</i> ), <b>moderate up to medium</b> productivity.	One cut every year, at the beginning of September (if necessary around mid-August)	Two cuts every year, between end of may until end of June and around mid-September
Extensively used greenland ( <i>Arrhenatherion</i> ), <b>low up to moderate</b> productivity	One cut every year, at the beginning of September (if necessary around mid-August)	One cut every year, between end of may until end of June or around mid-September
Extensively used greenland ( <i>Arrhenatherion</i> ), <b>moderate up to medium</b> productivity	One cut every year, at the beginning of September (if necessary around mid-August)	Two cuts every year, between end of may until end of June and around mid-September
Tall herb vegetation, <b>moderate up to high</b> productivity ( <i>Filipendulion</i> )	One cut every second year, at the beginning of September	One cut every second or third year, around mid-September

### Literary quotes:

STETTNER, C., BRÄU, M., BINZEHÖFER, B., REISER, B. & J. SETTELE (in prep.): Pflegeempfehlungen für das Management der Ameisen-Bläulinge *Maculinea teleius*, *Maculinea nausithous* und *Maculinea alcon* – Ein Wegweiser für die Naturschutzpraxis. Natur und Landschaft

VÖLKL, R.; REISER, T.; STETTNER, C. BRÄU, M. & J. SETTELE (in prep.): Auswirkungen von Mahdterminen und -turnus auf Populationen der Ameisen-Bläulinge *Maculinea teleius* und *Maculinea nausithous*

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