

# **Slug Report 2001/2002**

## **Introduction**

The following report is the result of four years of observations on the life of the common garden pest known as slugs ie shell-less molluscs. The purpose has been to find an effective way to control their numbers preferably without having to use any kind of poison in the garden itself.

## **The Garden**

The garden under observation is located on the border between Staffordshire and Cheshire on the South-Western slopes of the hill known as Mow Cop. It is approximately square 20m x 20m and oriented North-South. Along the northern and eastern borders are stone- and brick-built walls and houses. Along the southern border is a garden of some sizeable trees and shrubs casting considerable shade onto the garden under observation even at the height of summer. On the western border is another small garden, which is largely un-kept apart from occasionally cutting of grass and hedges. Beyond these gardens there are open fields grazed by dairy cattle.

## **Methodology**

Observations have been ongoing since 1999\* and have been undertaken by collecting all visible slugs fairly regularly and systematically. Records have then been made of the numbers collected, time of day and four broad types of weather conditions: Humidity, temperature, cloud cover and wind as described in Appendix 1.

Regularly, but not always, the weight of a collection will have been recorded. For this ordinary kitchen scales were used.

Records and the analyses thereof are kept on PC in the programme known as Excel.

It soon became clear that the optimal time for collection is around midnight and very few slugs are found active and visible at any other time of the day. Most collections have therefore taken place at that time.

It is also clear that they are not seen during the cold winter months and collections are therefore limited to the summer months from April to early November.

\*Unfortunately the PC broke down during the year 2001 and all files kept on it were lost including the records of slug collections for 1999 and 2000. This present report can therefore only deal with the years 2001 and 2002.

## Some Results

**Table 1: Summary**

<u>Year</u>	<u>Collections</u>	<u>No Collected</u>	<u>Av No per Collection</u>	<u>Weight</u>	<u>Av Weight</u>	<u>Av Weight per Collect</u>
2001	115	783	6.81	1401	1.79	12.18
2002	70	685	9.79	1024	1.49	14.63

Table 1 shows that with fewer collections fewer slugs were collected in 2002 than in 2001, 685 and 783 the year before. This is less than half the number collected in previous years (see footnote, page 1) and slugs are now much less of a pest than they have been in the past. It is also seen that they each was smaller in size, 1.49 grams on average compared to 1.79 the year before.

Two years' observations may not be conclusive evidence for an investigation of this kind, but Appendix 2 and 3 seem to suggest that after they first emerge in the spring, slugs will increase in numbers and weight during the early summer ie April and into June. They then suffer a temporary setback during July only to re-emerge in late summer and early autumn.

This kind of cycle may be a result of July being the warmest month of the year with little or no wind and evidence from the following tables suggests that they can only tolerate a fairly limited temperature range from a minimum of about 10° C to a maximum of perhaps 23°. At this time of the year food may also be difficult to come by as vegetation is at its strongest and therefore resistant to 'attack'.

The categories used to describe the weather conditions under which slugs were collected are set out in Appendix 1. The next task was to determine under which conditions slugs were at their most active and conversely which conditions they disliked most. In other words under which conditions does one find most about in the garden and when is one least likely to find any.

Firstly a simple summary was produced as shown in Appendix 4. From this it is seen that a clear sky is preferred to cloudy conditions; cool or mild temperatures are preferred to cold or warm; dry and mist is preferred to wetness and drizzle; and no wind (still-ness) is preferred to breezy and windy conditions.

By a method of continuing trial and error, combinations of these conditions were further tested and the following tables seemed to be the most conclusive.

Both Table 2 and 3a suggests that a combination of dry and still weather would be most productive for finding slugs at a temperature of 'mild' or 'cool'. Drizzly, wet and windy conditions were found not to be productive as were conditions of extreme temperatures.

**Table 2: Slugs Collected with Air Temperature ‘Mild’**

<b>Humidity</b> <b>Wind</b>	<b>Dry</b>	<b>Wet</b>
<b>Breeze</b>	43	82
<b>Still</b>	287	46

**Table 3a: Slugs Collected with Air Temperature ‘Cool’**

<b>Humidity</b> <b>Wind</b>	<b>Dry</b>	<b>Wet</b>
<b>Breeze</b>	51	73
<b>Still</b>	352	79

These findings were further explored in Table 3b and 4. It would seem from these that stillness is likely to be a most important factor in the environment of a slug. Furthermore clear skies and a dry atmosphere seem to be very important.

A first conclusion would therefore be that if one is to ‘hunt’ slugs a still, dry and mild night just after midnight is likely to be the most productive.

**Table 3b: Slugs Collected with Air Temperature ‘Cool’**

<b>Sky</b> <b>Wind</b>	<b>Cloudy</b>	<b>Broken Clouds</b>	<b>Clear</b>
<b>Windy</b>	15* 7.50**	17 5.67	- -
<b>Breeze</b>	76 6.91	31 7.75	17 8.50
<b>Still</b>	90 6.43	80 6.15	261 10.44

\*No.s collected. \*\*No.s collected per collection.

**Table 4: Slugs Collected with Humidity 'Dry'**

Wind \ Sky	Cloudy	Broken Clouds	Clear
<b>Windy</b>	5* 5.00**	14 7.00	- -
<b>Breeze</b>	28 4.00	46 5.75	61 7.63
<b>Still</b>	219 7.55	143 7.53	363 10.37

\*No.s collected. \*\*No.s collected per collection.

### **Some Other Conclusions**

Slugs are nocturnal and do not like broad daylight. This may not necessarily be because of the light. This is also the time of the day when wind on average is at its weakest and at summer time vegetation is wet from dew.

They will tolerate deep shade as in some gardens or in woodlands. However, in such areas there is not likely to be much wind and the ground under the trees and shrubs is likely to be wet.

They do seem to prefer a dry atmosphere as long as the surfaces ie vegetation on which they move remain wet or moist.

They do not like wet, humid conditions, and will not tolerate running water ie rain or drizzle.

They do not like windy weather and prefer completely still conditions, but will tolerate a moderate breeze.

They do not like extreme temperatures and will become inactive, seek shelter or hibernate below approximately 10<sup>0</sup>C. Likewise they will not tolerate very warm conditions.

There are many different species and probably more than generally recognized and they come in all sizes from the length of a single millimetre weighing a fraction of one gram to small monsters measuring 10-20 cm weighing up to 25-30 grams.

Their preferred food items are soft, moist and fleshy plant material such as newly germinated seeds, ripening fruits and in the autumn decaying, but not rotten vegetation. They may also feed on faeces left by cats and dogs.

When not active, they will shelter anywhere where two surfaces meet such as the inside of flowerpots; at the bottom of walls where the brickworks or stone disappear into the vegetation; underneath stones and large chunks of wood.

### **How to Control Slug Numbers**

Be active in your garden. Deprive them of shelter ie cut the vegetation as close to walls and stones as possible and do it frequently. Generally do not leave flower beds and vegetable beds to develop into miniature jungles. Do not leave dead vegetation on the ground for too long ie after weeding. Regularly check under broad leaved plants, big shrubs etc. Collect them and destroy them regularly and systematically.

There are a lot of makes of slug pellets about and manufacturers claim they are eco-friendly. That may be so, but it seems sensible to keep a healthy scepticism. One wonders what the effects are on other wild life (especially those animals that feed on slugs), plants, the soil and the environment in general. My advice is therefore to use them sparingly.

Slug fences are a Danish invention. They consist of large metal plates approximately 1ft in height and 4 ft in length, with a sharply bent edge which slugs and snails apparently cannot pass. The plates are pressed into the ground round a vulnerable crop and serve to keep slugs and snails out. I did only become aware of these until last year and I cannot be sure of their effectiveness at this stage.

### **The Down Side of Control**

Having considered how best to combat excessive numbers of slugs we should not forget that they do also have a positive side.

They provide food for frogs, hedgehogs and some birds and by destroying them we deprive these creatures of an important source. By breaking down decaying vegetation in much the same way as earthworms they do also have a role to play in the biology of our environment. It is therefore control we should aim for, not extinction by spreading poison or other means.

### **Questions**

Having studied these creatures for now more than four years many questions spring to mind. How much do we know and understand of these in many ways illusive creatures? What is their role within the eco-system that is a domestic garden? Will they wander and if so how far?

How many different types or species are there? Do they all have different life cycles and feed on different material and therefore have different roles within the eco-system? Are the many different colourings specimens of different types or are there different colourings at different stages in their life cycle? Are the many different sizes, slugs of different age? How fast do they grow? How big can they get? How old can they get?

When do they breed? When do their eggs hatch? How long is the period of incubation?

Is there any evidence that their natural enemies such as hedgehogs and frogs will attempt to eat a poisoned slug?

## **Appendix 1: Weather Conditions**

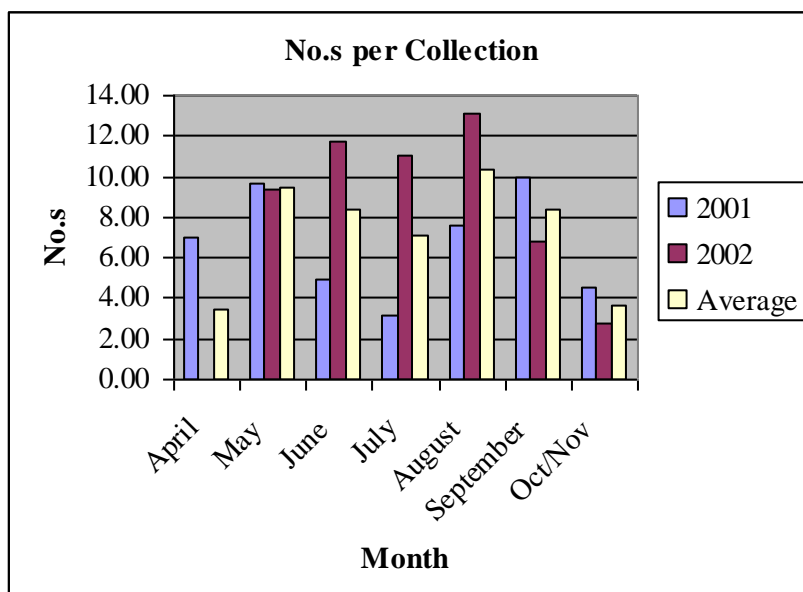
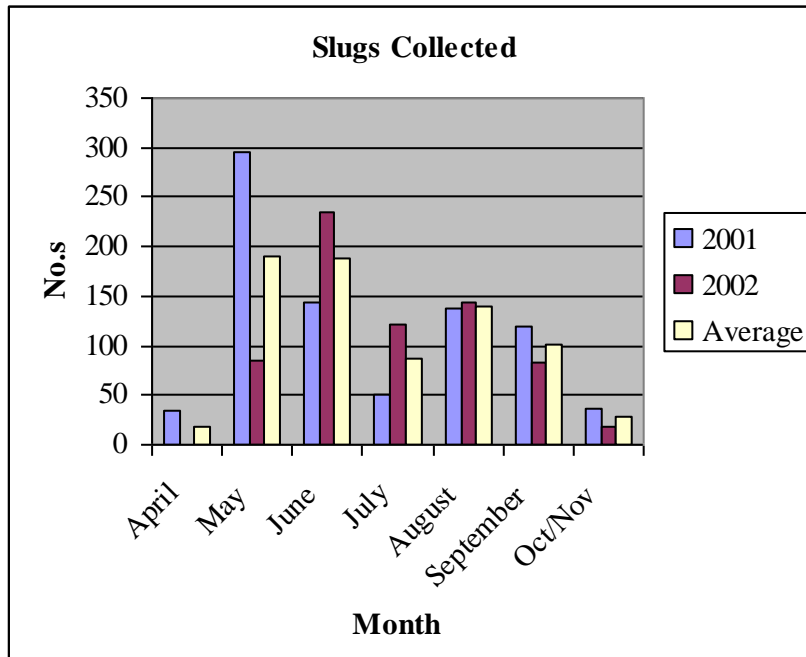
**Cloud Cover:** Cloudy, broken clouds, clear

**Temperature:** Cold, cool, mild, warm

**Humidity:** Dry, mist, wet, drizzle, rain

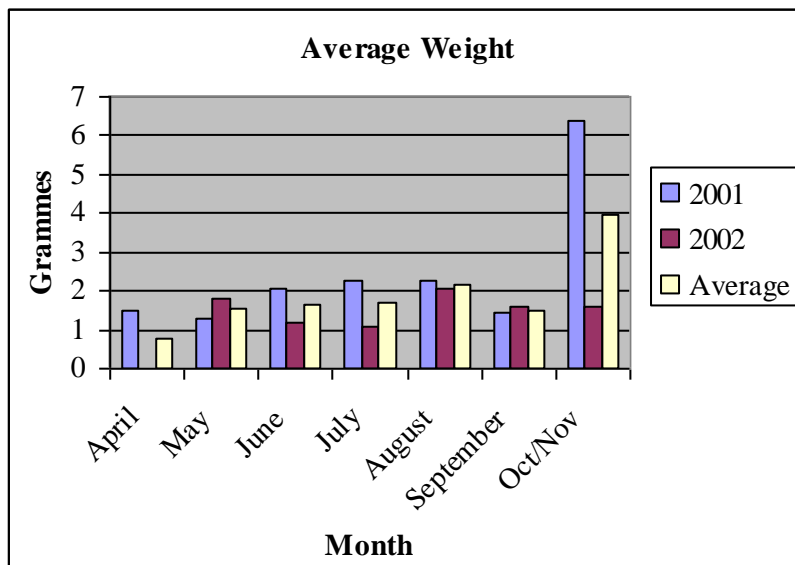
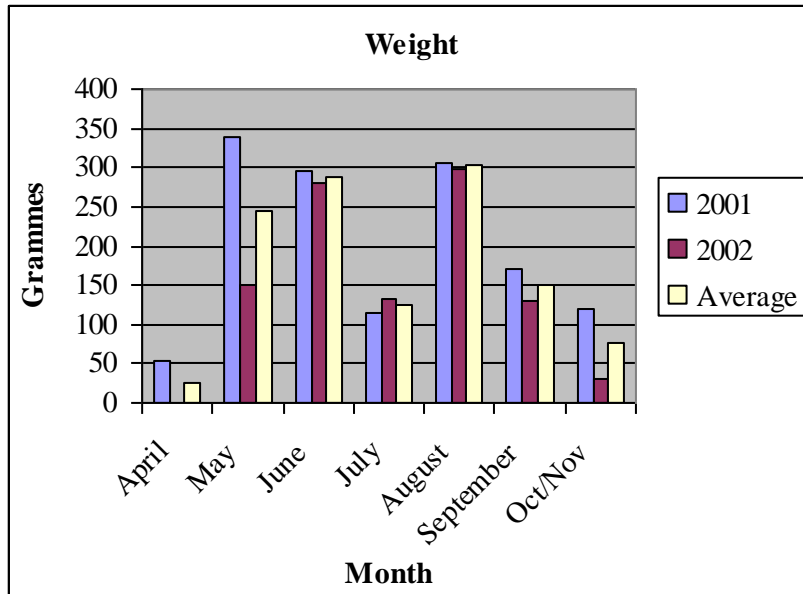
**Wind:** Still, breeze, windy

## Appendix 2: Numbers





### Appendix 3: Weight



## **Appendix 4: Climate Conditions**

	<b><u>Numbers</u></b>	<b><u>Collections</u></b>	<b><u>No per Collection</u></b>
<b><u>Cloud Cover</u></b>			
Cloudy	645	93	6.94
Broken Clouds	297	45	6.60
Clear	528	50	10.56
<b><u>Temperature of Air</u></b>			
Cold	174	24	7.25
Cool	587	74	7.93
Mild	588	72	8.17
Warm	121	18	6.72
<b><u>Humidity of Air</u></b>			
Dry	879	109	8.06
Wet	485	65	7.46
Mist	57	7	8.14
Drizzle	49	7	7.00
<b><u>Wind</u></b>			
Still	1015	118	8.60
Breeze	358	56	6.39
Windy	97	14	6.93