ECOLOGY OF THE COMMON VIPER *VIPERA BERUS BERUS*.

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INTRODUCTION

This article briefly records the results of ecological research on the factors characterising the basking places of the Common viper, *Vipera berus berus*. The research was conducted between March and October 1984 and from March to June 1985. The population selected for study was in the Ermelo/ Putten region of the Netherlands.
Systematic searching for specimens of this snake was undertaken; for each specimen observed notes were taken relating to the immediate surroundings, vegetation types and the orientation of the plot with respect to the sun. Temperature, humidity and time of day were also recorded.
The snakes were then caught, using the following method. The snake was disturbed, so that it retreated from the catcher, who then grasped the snake's tail, at the same time ensuring that the snake's head maintained contact with the ground (so that the animal did not attempt to bite). A section of clear plastic tubing was then placed in front of the snake, which was then coaxed into entering the tube for a distance of roughly twothird of its length. The remaining third of the snake was marked by scale clipping the ventral scales. Each snake was clipped in such a way as to provide it with its own code (see figure 1).

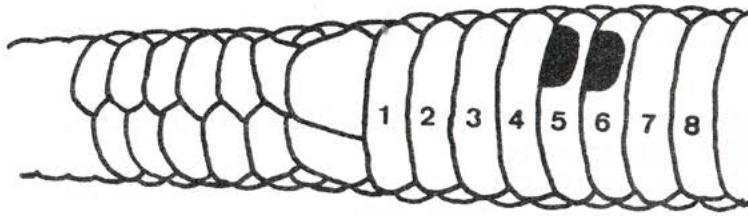


Fig. 1. Snake with code 5,6 L.

The tubing which the snake was induced to enter was graduated with centimetre markings, thus an estimation of the snake's length could be obtained. Once in the tubing, snakes were very easy to handle, and appeared to feel secure and generally not stressed.

RESULTS

The results, relating to 22 marked specimens, record details on 172 observations of sunbathing Common vipers, *Vipera berus berus*. Table 1 gives subsoil/vegetation types on which snakes were found basking in the three relevant seasons.

Body contact with	Spring %	Summer %	Autumn %
Bare soil	5	50	13
Wavy hairgrass	50	20	87
Ling	45	30	0
Total	100	100	100

Table 2 records the tree type under which specimens were found. All specimens observed were basking under a tree providing some degree of shelter from direct sunlight.



Fig. 1. *Vipera berus berus*, Ermelo. Begin van de adderdans / Start combat dance of two males. Foto: J. van der Rijst.

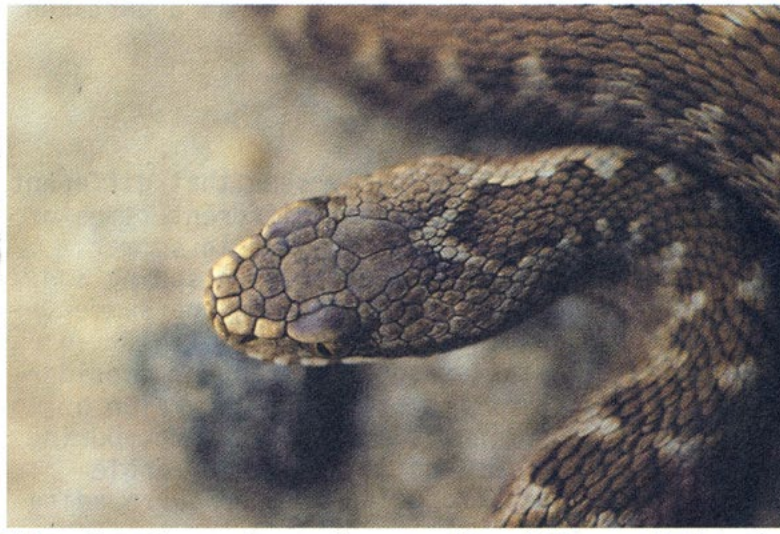


Fig. 2. *Vipera berus berus*, Hoge Veluwe. Foto: J. van der Rijst.

Type of shelter	Spring %	Summer %	Autumn %	Total %
Evergreen (pine, fir, spruce)	88	53	28	61
Deciduous (birch, oak, larch)	12	47	72	39
Total	100	100	100	100

During spring, Common vipers were recorded on almost every visit. The temperature in the shade was measured on each occasion, and in spring ranged from 9^0C to 20^0C. During summer, specimens were only recorded when the temperature was in the range 15^0C to 21^0C, and most were seen in days when the temperature was between 18^0C and 21^0C. Several 'blank' days were recorded in summer when the temperature was in the range 15^0C to 18^0C. During autumn sunbathing vipers were found on every occasion when the field work was undertaken in sunshine.

DISCUSSION

From table 1 it can be clearly seen that different subsoil types are preferred at different times of the year: bare soil is most popular in summer, whilst wavy hairgrass is preferred in spring and autumn. Ling, popular in both spring and summer, is not used in autumn. To explain this shift in preferences with the seasons, the author considered the difference of the angles of incursion of the sun between spring, summer and autumn. During spring and autumn the sun is at a lower angle than during summer, producing a lower surrounding temperature. In attempts to utilise the available

sunlight to its fullest effect, the Common vipers bask on inclined surfaces so that they catch the sunlight at an angle of less than 90 degrees. The required inclined surfaces are provided by wavy hairgrass or heather tussocks. The drawback is that sunbathing vipers basking on tussocks are much more easily visible to predators. Tussocks are utilised as hiding places all year round.
It is remarkable that no Common vipers were encountered sunbathing on areas not sheltered from above by trees. During spring the vipers utilise areas under conifers, since deciduous trees at that time of year have no leaves. During summer deciduous trees (particularly birch) are favoured. Birch trees tend to stand in the sunniest positions, and allow relatively large amounts of light to reach the ground below them. These factors may be particularly important in late summer when the decreasing altitude of the sun's rays preclude successful sunbathing in many other areas.
During spring, Common vipers were encountered on every sunny day and on other days too, sometimes even during rain (but only when the temperature was in excess of 15^{0}C). On 27 May 1984 a pair of copulating vipers was encountered in pouring rain; the temperature was 13^{0}C.
During summer sunbathing vipers were only found on days when the temperature was between 18^{0}C and 20^{0}C. Those encountered were mainly gravid females, specimens which have recently fed or snakes coming up to slough. During the autumn of 1984 no temperatures above 20^{0}C were recorded. Sunbathing vipers were seen on every sunny visit.
In addition to selection of the optimum site for sunbathing according to the season and prevailing temperature and habitat conditions, the snake also changes body attitude in order to capitalise on available sunbathing possibilities. During the course of the research Common vipers were found to adopt many different attitudes whilst sunbathing;

stretching of the whole body, coiling, flattening of the body. Flattening of the body is a way of offering the maximum surface area for heat absorption, as is stretching the body. Coiling of the body, which gives a lower surface area, was found to be most commonly utilised on days when the temperature was high, or after periods of prolonged sunshine. Specimens stretched out in the early morning would be found coiled a few hours later. Furthermore, the individual snakes will move within a small basking area in order to utilise the sun most effectively, particularly during the spring. The example shown in Figure 2 utilised three adjacent tussocks in turn. During the morning, tussock 1 is almost in a perpendicular plane to the sun's rays. By noon, tussock 2 is angled at the most desirable elevation to the sun's rays, and is therefore preferred during the middle of the day.

In order to emphasise the influence of the seasons, let us consider the sunbathing behaviour of Common viper coded 19,20 R at a particular location. This individual spent most of the summer sunbathing beneath the low-hanging branches of a spruce tree. These branches are only 20 to 30 cm above the ground, so that the snake was not easy to find. By September, what was previously the basking area was never sunlit, and the specimen moved to an alternative (more exposed) spot. The latter sunbathing place was sheltered by a birch branch situated at least 1 m from the ground.

The author wish to emphasise that although *Vipera berus berus* adopts this pattern of behaviour with respect to sunbathing in the area between Ermelo and Putten, when different conditions prevail in other regions or countries, the snakes are likely to have adopted to their local circumstances in different ways.

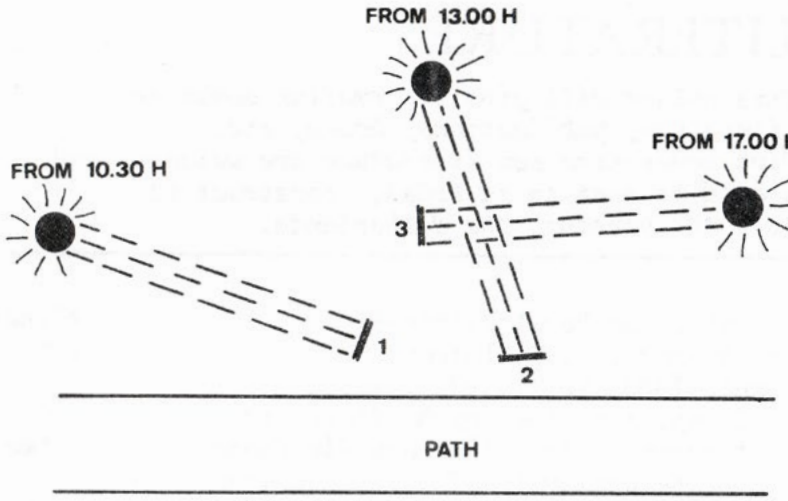


Fig. 2. Sunbathing places during a day.

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