

## A record of the ant-lion *Euroleon nostras* (FOURCR.) (Neuroptera Myrmeleontidae) in the Flemish coastal dunes (Koksijde) : a distant vagrant or an indication for overlooked populations?

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### Summary

On the 18<sup>th</sup> July 1999, an adult male of the ant-lion *Euroleon nostras* was captured at the inner dune front in Koksijde, Belgium. Here this species is typical for the inland Pleistocene dunes and has not yet been recorded in the Flemish coastal dunes. The origin of this individual specimen is discussed in this paper : either it is a specimen of an overlooked resident population, considering that the potential suitable habitat is largely available, or it is a distant migrant from the Dutch coastal dunes or the Flemish inland dunes. The latter hypothesis would imply that the species, in contrast to previous findings, is capable of bridging large gaps between suitable habitats.

**Keywords :** *Euroleon nostras*, Myrmeleontidae, distribution, habitat, dispersal

### Introduction

The Flemish coastal dunes in Belgium are one of the best studied regions for invertebrates. Besides 'popular' taxa like Orthoptera and Lepidoptera, terrestrial invertebrates were studied using pitfall sampling in almost every dune-area (HUBLÉ, 1975, HUBLÉ, 1976; HUBLÉ & MAELFAIT, 1981; DESENDER *et al.*, 1982; DESENDER, 1988; MAELFAIT *et al.*, 1990; DESENDER *et al.*, 1991; DESENDER & HUYSEUNE, 1991; SLOSSE, 1991; SLOSSE, 1992; MAELFAIT 1993; DESENDER, 1996; MAELFAIT *et al.*, 1996; BONTE & HENDRICKX, 1997; BONTE *et al.*, in press), as a result of faunistical interest by local nature conservationists and the Flemish administration AMINAL (monitoring-project of nature management and evaluation of the grazing management). Although adult ant-lions are rarely observed, populations can easily be detected by searching for the typical larval pits. Until now, no ant-lions were known from the Belgian coastal region, although two species *Euroleon nostras* and *Myrmeleon formicarius* L. are known from Belgium. *E. nostras* can easily be distinguished by the pre-

sence of dark wing markings, which are absent in *M. formicarius* (ASPÖCK *et al.*, 1980). Larvae can be recognized by markings on the head and on the third leg (absent in *E. nostras*) (GEPP & HÖLZEL, 1989).

### Discussion

On July 18<sup>th</sup> 1999, one flight-active male was captured by the second author at sunset at the inner dune front in Koksijde (West-Flanders), near an urban area. The area consists of stabilized blond dunes, overgrown by planted *Populus alba* and with patches of bare sand, neighboring urban gardens. The area belongs to the former large dune area of Koksijde-Oostduinkerke, but is now isolated from other dune areas by residential urban areas.

The record of an adult male of the ant-lion *E. nostras* in the Flemish coastal dunes can be interpreted in two ways :

1. The animal belongs to a resident, but overlooked population along the Flemish West-coast;
2. The animal originates from a non-native po-

pulation. This would imply long distance dispersal, which contrasts with statements by JONES (1991) and SCHERER & TSCHARNTKE (1995) for both sexes of *E. nostras*.

### An overlooked population along the Flemish coast?

In Belgium, *Euroleon nostras* occurs in the inland sandy region of the Antwerp, Brabant and Limburg provinces. Scattered records are available from the provinces of Liège and Luxembourg (Fig 1). The species is absent from the sandy Pleistocene regions of Western and Eastern Flanders, although the animal was actively searched for recently by local managers and

scientists (University of Ghent and KBIN) within the framework of the project 'inventory of invertebrates in the inland dunes of Eastern Flanders : present status and potentials for nature conservation'.

It is assumed that the species' absence from the inland dunes of Eastern and Western Flanders is the result of heathland degeneration due to woodland creation and high recreational pressure. The species requires open sandy places sheltered by woodlands, shrubs or heathland, but disappears when the vegetation cover becomes too dense or when recreational disturbance interferes with the construction and maintenance of larval pits (BOER, 1998; STEVENS, 1992; STRUIJK, 1996).

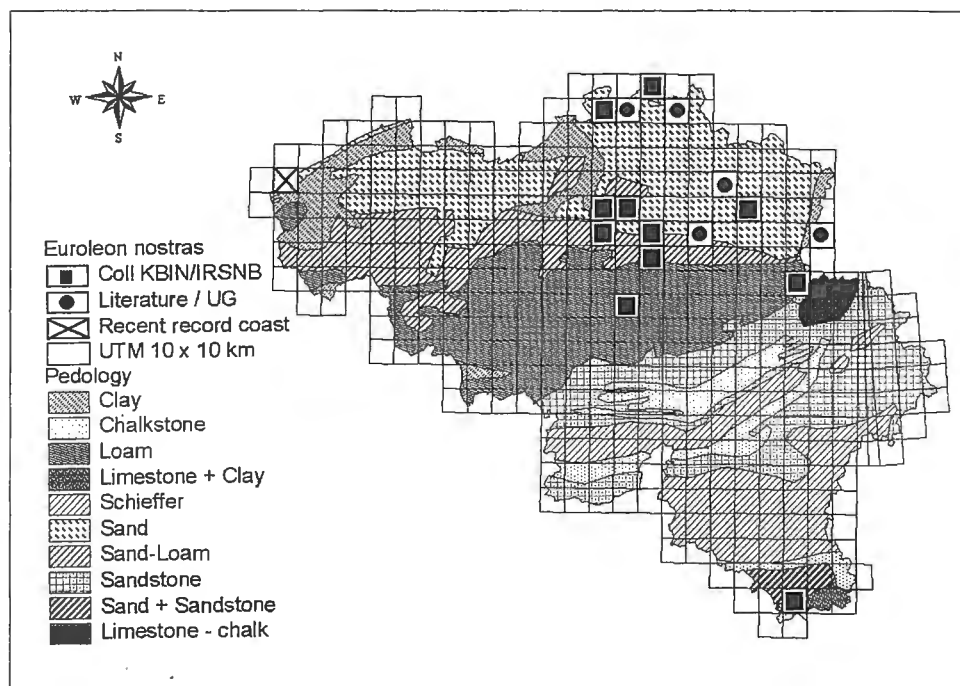


Fig 1. Distribution of the ant-lion *Euroleon nostras* in Belgium. Data from collections KBIN/IRSNB, Literature and excursions University Ghent and personal observation.

BOER (1999) and STRUIJK (1996) found populations of the ant-lion in the Dutch coastal dunes, which are climatologically similar to the Flemish coastal dunes.

In the Netherlands, ant lions occur both in the southern as well as in the northern coastal dune regions. Consequently, differences in pedological condition (presence of an important lime fraction and relatively larger grain-size of sand in the South versus the North) cannot account for the distribution of the animals. On the other hand, population density is significantly affected by these factors, with lower densities in the lime-rich dunes (BOER, 1998). The Flemish dunes of

the West coast are similar to the Dutch south of Bergen-aan-Zee, with similar pedology and an analogous vegetation (shrub in mosaic with dune grasslands belonging to the Galio-Koelerion). In the absence of sheltered sandy spots between heathland vegetation, larval pits are situated in the proximity of steep sand sides (mainly rabbit holes) in the Galio-Koelerion grasslands (BOER, 1999 & STRUIJK, 1996). Population density on the contrary is significantly affected by soil constitution, with lower densities of ant-lions occurring in lime-rich dune landscapes (BOER, 1999). The preferred habitat of ant-lions in southern Holland, being stable and undisturbed Galio-

Koelerion grasslands in combination with bare sand overgrown with mosses, is largely available along the Flemish West coast. There are a number of possible causes why a resident population of large insects such as *E. nostras* can be overlooked (PLANT, 1998) : populations are situated in private dune areas with restricted access, populations are too small for chance observation (by non-entomologists) and build up as a meta-population with large year to year fluctuations. Also, adult ant-lions are nocturnal and rarely attracted by lepidopterists light-trapping.

### Long-distance dispersal ?

If the ant lion *E. nostras* has a poor dispersal capacity (as stated by JONES (1991) and SCHERER & TSCHARNTKE (1995)), then it would be unlikely that it could bridge the large polder areas between the coastal and inland sandy regions. Since the nearest known population is in the southern coastal dunes of the Netherlands, colonization would have to occur by dispersal along the narrow coastal region of the Scheldt Estuary, if potential barriers such as Marram (*Ammophila arenaria*) dune landscapes, rivers (Scheldt estuary) and urban areas can be crossed. An analogue colonization from the northern French coastal dunes is also possible. There the species is certainly absent in the coastal dunes, in the north of Duinkerke. It may however be present in the Boulonnais-area, where old and decalcified coastal dunes are present (although the species has not been recorded in a recent intensive invertebrate sampling campaign; BONTE, unpub. data). Adult ant-lions are known to be skillful fliers when maneuvering between the branches of pine trees (YASSERI, 1991, 1994) but only slow fliers (BRODSKY, 1994). The larger females conduct a dispersive flight, but they are known for their proximate migration. Individuals with higher egg-loads are less capable flyers than animals with fewer eggs (JONES, 1991), which reduces the species' colonization potential. SCHERER & TSCHARNTKE (1995) found that adults of the species were only able to colonize new isolated areas within the neighborhood (not exceeding 300 meters from the maternal colony). According to the recent colonizing of several Channel Islands by ant-lion (Guernsey : AUSTIN, 1999), however, distant dispersal does occur.

### Conclusion

Although no intensive search has recently been conducted in potentially suitable habitats of the Flemish coast, we remain in favor of the hypothesis that the spotted individual does not belong to an overlooked population, but concerns a vagrant from distant populations (Netherlands, Belgium, Northern France, or Great-Britain?). This would imply that the species is able to migrate over long distance, in contrast to previous findings in the literature.

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### References

- AUSTIN R. 1999. - *Euroleon nostras* finally arrives on Guernsey. *Neuro News* 24 (summer 1999) : 3
- ASPÖCK H., ASPÖCK U. & HÖLZEL H., 1980. - *Die Neuropteren Europas*. Goeke & Evers, Krefeld.
- BOER P., 1999. - Mierenleeuwarven (Neuroptera : Myrmeleontidae) in de kalkarme en kalkrijke Noord-Hollandse duinen. *Entomologische Berichten Amsterdam* 59(4) : 45-52
- BONTE D. & HENDRICKX F., 1997. - Aanvullende gegevens omtrent de spinnenfauna van enkele duingebieden aan de Belgische Westkust. *Nieuwsbrief van de Belgische Arachnologische Vereniging* 12(2) : 33-43.
- BONTE D., MAELFAIT J.-P. & HOFFMANN M., in press. - Impact of intensive cattle-grazing on the arachnofauna (Araneae) of an intensive grazed dune grassland. *J. Coastal. Conserv.*
- BRODSKY A. K., 1994. - *The Evolution of Insect Flight*. Oxford University Press.
- DESENDER K., 1988. - Ongewervelden in de Houtsaege-ruinen. *Duinen* 3 : 64-67.
- DESENDER K., 1996. - Diversity and dynamics of coastal dune carabids. *Annales Zoologica Fennici* 33 : 65-75.
- DESENDER K., MAELFAIT J.-P. & BAERT L. 1991. - Monitoring Carabid beetles in Belgian Coastal dunes. *Proceedings of the 4th ECE/XII.SIEEC, Gödöllö* : 153-158.
- DESENDER K., HUBLÉ J. & VANHERCKE L., 1982. - Loopkevers, spinnen en hooiwagens van het duinreservaat 'De Kijkuit' te De Haan (West-Vlaande-

- ren). *Phegea* 10 (4) : 201-214.
- DESENDER K. & HUYSSSEUNE A., 1991. - Enkele gegevens over de loopkeverfauna van "De Groenedijk" ('O.L.V. Ter Duinen, Oostduinkerke) en "de Schuddebeurze" en omgeving (Westende). *Duinen* 5 (1) : 57-63
- GEPP J. & H HÖLZEL, 1989. - Ameisenlöwen und Ameisenjungfern (Myrmeleontidae). *Die neue Brehm-Bucherei* 589, 108 pp.
- HUBLÉ J., 1975. - Arachnofauna van strooisel onder duinstruweel van de Belgische Westkust (soortenlijst). *Biologisch Jaarboek Dodonea* 43 : 146-150.
- HUBLÉ J., 1976. - Bodemspinnen van duinmoeras en helmduinen in het staatsnatuurreservaat 'De Westhoek' (Soortenlijst). *Biologisch Jaarboek Dodonea* 44 : 226-230.
- HUBLÉ J. & MAELFAIT J.-P., 1981. - Analysis of the spider fauna from a north and a south facing slope of a coastal dune (Belgium). *Faunistisch-Ökologische Mitteilungen* 5 : 175-189.
- JONES R.E., 1991. - Host location and oviposition on plants. In BAILEY W.J. & RIDSDILL-SMITH J. (eds.) *Reproductive behaviours of insects : Individuals and populations*. pp. 108-138. Chapman & Hall, London
- MAELFAIT J.-P., 1993. - Spinnen en natuurontwikkeling in het duinengebied 'Home Theunis' te Oostduinkerke. *Duinen* (4) : 146-154.
- MAELFAIT J.-P., BAERT L. & DESENDER K., 1990. - Faunal interest of wet dune grasslands along the Belgian coast. *Belgian Journal of Zoology*. 120 : 46.
- MAELFAIT J.-P., BAERT L. & DESENDER K., 1996. - Nature conservation management in coastal dunes and spiders. *16th European colloquium of arachnology. 04 July 1996-13 July 1996, Siedlce, Poland. Siedlce, Poland.*
- PLANT C.W., 1998. - *Investigations into the distribution, status and ecology of the ant-lion Euroleon nostras (Geoffroy in Fourcroy, 1785) (Neuroptera : Myrmeleontidae) in England during 1997.* Report number BS/014/97, Nature Conservancy Council for England (English Nature), the Royal Society for the protection of Birds and the author.
- SCHERER M. & TSCHARNTHE, T. 1995. - Habitatwahl aus Ausbreitungsverhalten des Ameisenlöwen *Euroleon nostras* (Fourcr.) (Neuroptera, Myrmeleontidae). *Mitteilunge Deutsche Allgemeine Entomologie* 10: 313-317.
- SLOSSE W., 1991. - Onderzoek invertebratenfauna in de Doornpanne te Koksijde. *Duinen* 5 (1) : 32-56
- SLOSSE W., 1992. - Verslag preliminair invertebratenonderzoek in de Oostvoorduin. *Duinen* (2) : 20-30
- STEVENS J., 1992. - Bijdrage tot de ecologie van de mierenleeuw *Euroleon nostras* in de Limburgse Kempen. *Jaarboek Likona* 1992 : 28-35
- STRUIJK R., 1996. - Mierenleeuwen in de duinen van Walcheren. *De Levende Natuur* 97 (4) : 155-159
- YASSERI A. M., 1991. - Über das Vorkommen von *Euroleon nostras* (Fourcroy) (Planipennia : Myrmeleontidae) im Naturschutzgebiet Fischbeker Heide. *Naturschutz und verhalten Zeitschrift Seevögel* 12 : 123 - 126.
- YASSERI A. M., 1994. - Zur Fortpflanzung der Gefleckten Ameisenjungfer, *Euroleon nostras* (Four.) im Freiland und Labor. *Artenschutzreport* 4 : 56 - 62.