A. GROUVELLE, 1890. — *Diagnoses provisoires (Helmis capensis, incerta, georyssoides)*. Ann. Soc. Ent. Fr., X, CCXII.

A. GROUVELLE, 1895. — *Coléoptères de l'Afrique australe*. Ann. Soc. Ent. Fr., LXIV, 165-167.

A. GROUVELLE, 1899. — *Descriptions de Clavicornes*. Ann. Soc. Ent. Fr., LXVIII, 185 (*Helmis mixta*).

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NOTE ON A MIGRATION OF THE DRAGONFLY LIBELLULA QUADRIMACULATA L. IN THE NORTH OF FRANCE

by Henri J. DUMONT (Denderleeuw)

During a two week's stay at the station for Marine Biology of Wimereux*, near Boulogne, in the north of France, I was given an unexpected opportunity to observe a migration of the dragonfly *Libellula quadrimaculata* L.

Though I arrived on May 15th, not a single dragonfly was to be seen until May 26th. That very day I noticed two libellulas passing by fast, near the station. The next day there were ten; on May 28th I saw ten more; on May 29th finally a real invasion of *Libellula* started.

A short investigation in the neighbourhood of the station proved that the whole surrounding territory (meadows, brushwood, dunes with shrub and bramble-bushes) was swarming with dragonflies, apparently flying round quietly at a low altitude, resting frequently on stalks and branches.

Nevertheless it was obvious that, in contrast with the normal behaviour of this species, their flight was hesitating, somewhat dancing and remarkably slow.

* From May 15th. until May 31 st. 1963.

In spite of this low speed, flying was coupled with an unusually high number of wing vibrations. The flying up of one individual also provoked the same reaction among most of the libellulas within a radius of one or two metres around it. P. GRASSÉ cites the same phenomenon for migrating dragonflies of another species. A few captured specimens proved to be adult. One female even reacted to captivity by depositing a parcel of eggs. This fact too seems to reinforce the view of GRASSÉ, who supposes that a sexual stimulus on mature individuals is one of the primary conditions to start a migration.

On May 30th, the mass of Libellulas was obviously less quiet than the day before; the nervousness had increased; small swarms constantly passed by the station, at an altitude varying between a few centimeters and two or three metres. At the same time, swarms of slowly migrating insects were present in the dunes near the station.

The migration was going straight southward, sticking closely to the coastline, towards Boulogne.

So it became possible to distinguish between the groups migrating over an uncovered surface (the main road from Calais to Boulogne and the surrounding meadows) who were flying fast and seemed to be very nervous, and the groups sticking to the dune area.

The migrating activity started at about 7 to 8 a.m. and reached its peak between 2 and 4 p.m., while the weather was sunny and the temperature rose as high as 20-22°C.

At about 8.30 p.m. the last specimens were seen passing by the station of Wimereux.

At 3 p.m. we decided to follow the column in the direction of Boulogne, over a distance of about six kilometers.

Over the whole distance, the air was literally swarming with dragonflies. The same spectacle was seen at Boulogne, where the insects remained as numerous, even up to the centre of the town.

Here, hindered by the buildings, the Odonata were forced to fly higher, over the roofs of the houses, which means from less than two up to more than 20 metres.

GIARD, who observed an identical and some six kilometers long convoy of *Libellula quadrimaculata* in 1889 remarks that, at certain times, the insects were all flying at an altitude varying between 6 and 15 metres.

In our case, they even went up higher, however this was due to artificial obstacles. In the open field, I never saw them rise higher than some 5 metres.

In the very centre of Boulogne, at the crossing of four streets, a count was made with the assistance of Dr. POLK.

One of these streets, lying half in the sunlight, half in the shadow, proved to be a perfect observation-post. All the libellulas flying by in 5 minutes, over the sunny strip, and up to an altitude of 9 metres, were counted. The sunny strip measured 8 metres in breadth.

A first count gave us a number of 300 specimens (15h25-15h30).

A second count gave only 280 specimens (15h35-15h40).

As it was obvious that, on the shaded part of the street additional specimens were passing to the rate of less than ⅓ of the number of those passing in the sunlit part of the street (concentration in the zone of highest temperature), we could deduce from our results that more than one insect per second passed by over an area of $12 \times 9 = 108$ m².

This gives us a total of some 4000 specimens an hour.

For an area of 1 km² we find about 400.000.

Though at the moment of our counting the migration was maximal, and though we can believe that in the streets the number of Libellulas was higher than over the roofs, the global sum of these insects, that passed by Boulogne on May 30h, must have been enormous.

On May 31th, the migration at Wimereux had still increased in intensity and number.

Unfortunately I had to leave the station on that day, so our observations could not be continued.

Nevertheless, I noticed while leaving, that the further we went from the coastline, the less Libellulas were to be seen.

Only 2 km from the coastline, all Libellulas had disappeared. From Calais up to Ostend (Belgium) we followed the shore again, but no trace of dragonflies was found any more.

A friend and collegue, W. ROGGEMAN, who left the station on the same day, but had gone north along the shore, told me that he had met migrating Libellulas as far as Cap Griz-Nez, but that here they seemed to arrive from over the sea.

Anyway, the convoy had disappeared North of Cap Griz-Nez.

In am unaware how much longer this migration lasted and where the insects finally arrived.

A few weeks later, I was informed that along a part of the coast of the Netherlands a similar invasion of *Odonata* had been reported. It seems very probable to me that it also consisted of *Libellula quadrimaculata*. It would be too much of a coincidence indeed, if at the same time, such a short distance apart, two distinct species would start migrating.

This is further emphasized by the fact that I noticed an unusual abundance of *Libellula quadrimaculata* at different places where I used to find this insect.

My countings proved :

1. That the numbers were four, five or even more times as high as in 1962.

2. That « oecological niches » were now occupied that used to be occupied by other species, who were at present practically absent (*Orthetrum coeruleum, Libellula depressa, Leucorrhinia dubia*).

A few examples :

Denderleeuw (Eastern Flanders) : over a pond with a surface area of ± 30 m².
4 specimens on June 15th, 1962.
40 specimens on June 5th, 1963.

Overmere (Eastern Flanders) : over an area of ± 100 m².
5 specimens, June 2nd, 1962.
18 specimens, June 8th, 1963.

Genk (Brabant) : over an area of ± 50 m².
10 specimens, May 30th, 1962.
45 specimens, June 20th, 1963.

Kalmthout (Antwerp), over an area of ± 70 m².
20 specimens, June 5th, 1962.
± 80 spécimens, June 9th, 1963.

These numbers emphasize the fact that this migration should not be regarded as an isolated fact, but that it results from an explosive development of the species, influenced by unknown favourable conditions.

Beside the sexual factor as a condition giving rise to a migration, other important facts must be taken into account. These factors, not yet understood, should probably be connected with the larval life period of the insect.

LITERATURE

Bugnion E., *Un vol de libellules* (Hemianax ephippiger Burm.) *observé au Maroc* (Bulletin de la Société Entomologique de France, 1928).

Conci C. et Nielsen C., *Odonata* (Fauna d'Italia, Vol. I. Calderini, Bologna, 1956).

Ghiliani V., *Migrazione d'insetti :* Anax mediteraneus De Selys (Anax senegalensis Rambur) (Gazetta di Torino, n. 272, 277, 280, 1867).

Ghiliani V., *Sopra alcune invasioni di Libelluline nell'Italia superiore* (Bull. Soc. Ent. It., Firenze, VI, pp. 227-228, 1874).

Giard A., *Sur un convoi migrateur de* Libellula quadrimaculata L. *dans le nord de la France* (Comptes rendus de la Société de Biologie, 15 juin 1889).

Grassé P., *Observations et remarques sur les migrations d'Odonates* (Livre du Centenaire de la Société entomologique de France, Paris, 1932).

Hagen H.A., *Résumé sur l'accouplement des Libellulidés* (Revue des Odonates, Roret, Paris, 1850).

Lichtenstein E.L. et Grassé P., *Une migration d'Odonates* (Bulletin de la Société entomologique de France, 1922).

Rostand J., *La vie des Libellules* (Stock, Paris, 1954).

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