

Ophrys insectifera

Ophrys insectifera is a well known and differentiated taxon in the genus *Ophrys*.

Ophrys insectifera was chosen by Linnaeus (1753) as the type species for the genus *Ophrys*.

Its distribution area is fairly wide for an *Ophrys* with great altitudinal (up to 2,000 m), soil and biotope amplitudes. That plant occurs, indeed, from the north southwards, from northern Norway down to center Spain and Italy, and from the East westwards from Russia to France.

Within that vast geographical area, two morphologically similar taxa can be distinguished, namely *Ophrys aymoninii* and *Ophrys subinsectifera*, which have quite small distribution areas some 200 kilometers apart. These two taxa are sister species of *O. insectifera* and were described rather recently.

Ophrys subinsectifera grows in an area covering three regions in N Spain on a limestone substrate, at elevations ranging from 260 m to 1,120 m. An off-centred site in a fourth region within the area is at an elevation of 1,340 m. The flowering period ranges from mid-May to mid-June.

The pollinators of these three *Ophrys* belong to different families of *Hymenoptera*. Numerous pollinators were observed and recorded on *Ophrys insectifera*: Coleopterans (*Anthobium*), Dipterans (flies: *Sarcophaga*, *Serina*), solitary wasps (*Argogorytes fargeii* and *Argogorytes mystaceus*) and even ants (*Camponotus ligniperda*). *Argogorytes* are members of the family *Crabronidae* (anc. *Sphecidae*). The pollinator observed on *Ophrys aymoninii* is a wild bee, *Andrena combinata*, which belongs to the family *Andrenidae*. Insects pollinate the latter two taxa with their head directed to the flower's sexual organs, a position commonly referred to as cephalic pseudocopulation. Finally, *Sterictiphora gastrica* belongs to the family *Argidae*. That insect exhibits unprecedented pollination behaviour.

Ophrys aymoninii

Ophrys aymoninii was distinguished north of the Causse Noir in 1981 by Breistroffer in the proceedings of the 104th extraordinary session of the Société Botanique de France. He had previously observed that plant, however, on May 26th, 1974, relying on a report by Aymonin and Virot who had noticed it on May 31st, 1959.

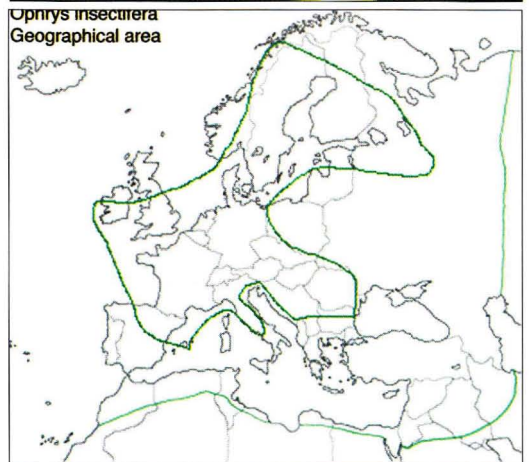


Fig 1 - *Ophrys insectifera* with its distribution map

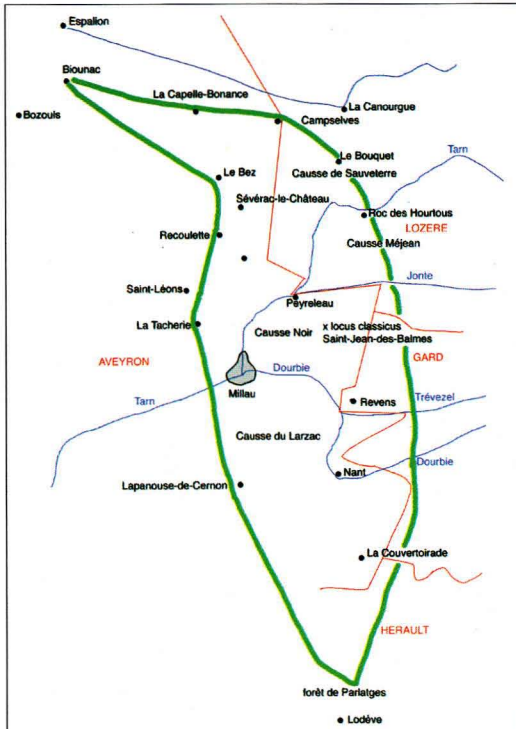


Fig 2 - *Ophrys aymoninii* with its distribution map

Breistroffer wrote: «That plant, which seems to be an outstanding ne endemic taxon living in a restricted part of the Causses, is featured by its lip exhibiting a broad fore margin with a nice yellow, just slightly greenish margin, that lip being velvety and markedly ashen-papillose, without any evidence of a small median protrusion at the truncated-roundish tip». Breistroffer hypothesized a possible result of hybridization involving *Ophrys insectifera* on the one hand and either *Ophrys litigiosa* or *O. lutea* on the other hand. It is noteworthy that local botanists like Fabre and Bernard knew that taxon, as well as the hybrid *Ophrys aymoninii* x *Ophrys litigiosa* which Bernard will subsequently dedicate to Fabre. Breistroffer concludes with these words: «Consequently, considering the lack of possible parents in the vicinity, taking the present ecological barrier separating it from *O. lutea* for what matters, it was deemed more advisable to give that taxon a subspecific status, the most closely related species being *O. insectifera*. Anyway, it seems the population that was observed during the session cannot be linked to any clearly defined unit. The Latin description of it is given here below».

Ophrys aymoninii only occurs in four departments of S France on limestone substrates, at elevations ranging from (500) 650 to 900 m. The flowering period ranges from mid-May to mid-June.

***Ophrys subinsectifera*, Historical background**

The first time I have heard of *Ophrys subinsectifera* was in April 1985. I was then a co-organizer of the IXth conference of the Société Française d'Orchidophilie.

During that conference Corbineau (1985) read, upon that conference, a paper focusing on this taxon. He concluded with the following quote "... we leave our Spanish friends to take care of carrying on with the study, determining, in particular, its distribution range and, if they think it is appropriate, giving it a suitable taxonomical status".

The second time, a friend of mine, Pascal Jarige, had found "odd *Ophrys insectifera*" in Catalonia in the province of Barcelona between Manresa and Odena. On our way back from a journey to Andalusia on April 22, 1992, with my friend François Jacquet, we unsuccessfully checked that finding. About thirty kilometers before, at the boundary of the Tarragona and Barcelona provinces, during a fortuitous stop, we came upon *Ophrys insectifera* with a small, yellow-bordered lip. That very feature drew our attention. The plants exhibited a great vigour, they were growing through a heap of branches from pruned pines. That patch of land was altered and ultimately ploughed. On May 21, 2005 we saw three plants within one hundred meters away.

Upon my field trips in Spain I never failed to go back to that place. Lastly, Hermosilla & Sabando (1996) described this taxon under the binomial *Ophrys subinsectifera*.

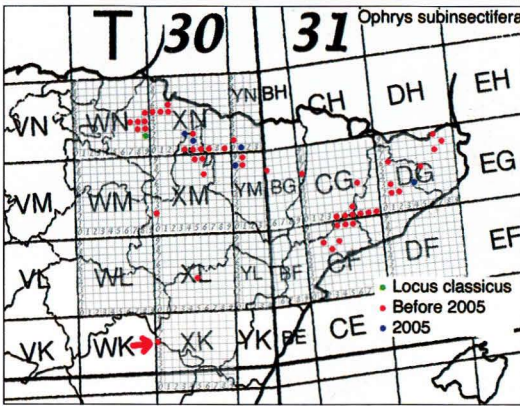


Fig 3 - *Ophrys subinsectifera* with its distribution map (left side)
 Fig 4 - *Ophrys aymoninii* and *Ophrys subinsectifera* distribution map (up)

The discovery in Spain of another taxon, *Ophrys aveyronensis*, gave me an opportunity to meet C. Hermosilla and make a series of journeys to study the orchids in N Spain, particularly *Ophrys subinsectifera*. During one of these journeys, on May 25, 1999, I could observe the pollinator which was captured at once by C. Hermosilla. Further investigations revealed that J.-P. Amardeilh had also observed and captured a similar insect one year earlier and had it identified by C. Villemant (Paris Natural History Museum).

On May 8, 2000 J.M. Tabuenca (in Benito Ayuso & Tabuenca Marraco 2001: 76) observed a "pseudopollination in diagonal" in Talamantes, province of Zaragoza.

In 2002, C. Hermosilla (com. Pers.) watched the behavior of an insect flying from *Crataegus* to an *Ophrys subinsectifera*, embarking on a pseudocopulation on a flower then roaming on another flower, before disappearing.

On May 22, 2004 passing through Erro (Navarre) I took a specimen of *Ophrys subinsectifera*; the day after, at 11 a.m. in sunny weather conditions at Saint-Martin-de-Londres (France, 500 kilometers off the collecting place), I laid out the plant outside. Two insects came and visited it successively.

A few days later, by the end of May 2004, C. Hermosilla (com. pers.) captured a male carrying a pollinium on the side of its thorax in Gulina (Navarre).



Fig 5 - *Ophrys insectifera* with its pollinator
 Fig 6 - *Ophrys aymoninii* with its pollinator

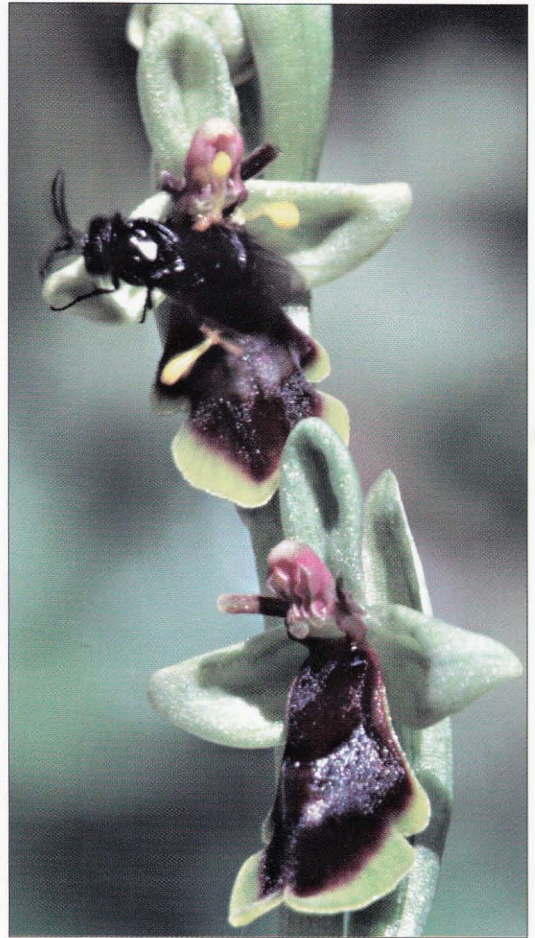


Fig 7 - *Ophrys subinsectifera* with its pollinator

I was lucky enough to correspond with T. Noblecourt who, after examining the photographs, diagnosed that it was *Sterictiphora gastrica*. The photographs taken in 1998 (J.-P. Amardeilh), 1999 (C. Hermosilla and R. Soca) and 2004 (R. Soca) show the same species.

***Ophrys subinsectifera*, Pollination**

On May 23, 2004, I pushed away the first insect which disturbed me when taking photographs of the plant. Then I realized, when looking at the second one, that it was a male *Sterictiphora*.

The plant that I was taking a photograph of had three open flowers and five in a bud stage, the lowermost one had already withered and the topmost one was quite fresh. I took the last two photographs of the film and, of course, the unexposed films had been left in the car. When I was back after some five minutes, the



Fig 8 - *Ophrys subinsectifera* with its pollinator



Fig 9 - *Ophrys subinsectifera* with its pollinator

insect had extracted one of the two pollinia from the central flower with its left hind leg and was standing in a very unique position on the upper flower: its body was lying crosswise at the stigmatic cavity, its head being directed leftwards. The two pairs of black fore and mid legs were claspings the LH sepal, one of them resting on the pollinia and the other one on the basal field right under the stigmatic cavity, the abdomen being folded back and frantically waving to and from inside the stigmatic cavity, so that the insect looked even shorter, since its abdomen was hidden when looking at it from above. The pollinia adhered approximately to the midpoint along the hind legs. To start with, the insect extracted a first pollinium from the central flower that stuck to the left hind leg. Then it flew to the upper flower. After ten minutes of a restless activity, both pollinia of that flower adhered to the RH hind leg. The insect came back to the central flower, then

flew away for good. The observation lasted over twenty minutes.

The photographs do not clearly show that the insect is sweeping crosswise (from left to right) the stigmatic cavity of the *Ophrys* with its abdomen. Its abdomen cannot be seen (from above) in some photographs.

As a conclusion: *Sterictiphora gastrica* shows a new unique pollinating behaviour with *Ophrys subinsectifera*. To my knowledge, the position of the hymenopterous insect and the extraction of the pollinia by the legs or the thorax, have never been reported so far. Moreover no species from the *Argidae* family was ever mentioned as an *Ophrys* pollinator.

Maps

Map with distribution of *Ophrys insectifera* in France and Spain

Map with precise distribution for *Ophrys aymoninii* and *Ophrys subinsectifera*

Acknowledgment

With my companions of ground: Javier BENITO AYUSO, Carlos HERMOSILLA, Rolando ROMOLINI; in Thierry NOBLECOURT who allowed me to rectify the name of the species of pollinating; in Nicolas J. VERECKEN for the second reading of the manuscript and Thierry PAIN for the english traduction.

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