

Changes in Fauna of Wild Bees in Europe
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THE FAUNISTIC DRIFT OF THE CARPENTER BEES IN FRANCE, BELGIUM AND ADJACENT AREAS (HYMENOPTERA, APOIDEA, XYLOCOPINAE)

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INTRODUCTION

The carpenter bee fauna of France, Belgium and adjacent areas comprises four *Xylocopa* species and eleven *Ceratina* species. Some of them are strictly localised in Southern France. They reach there the northern limit of their Mediterranean distribution: *Ceratina callosa* (Fabricius), *C. chalcites* Germar, *C. dallatorreana* Friese, *C. dentiventris* Gerstaecker, *C. gravidula* Gerstaecker, *C. mocsaryi* Friese, *C. nigrolabiata* Friese, *C. parvula* Smith and *X. cantabrita* Lepeletier. *Ceratina gravidula* reaches in France the occidental limit of its East-Mediterranean distribution (Terzo & Rasmont 1993).

The other species show an Euro-Mediterranean distribution more or less extended toward North. Some of them, as *C. cyanea* (Kirby), reaches Northern Europe. Others, as *C. cucurbitina* (Rossi), reaches only the latitude of Paris.

MATERIALS AND METHOD

The material studied by the authors comes from the museums of Paris, Leiden, Amsterdam and private collections. The authors have also collected in Southern France. The biogeographic and ecologic data from this material have been processed with the help of the software Microbanque Faune-Flore 3.0 (Rasmont *et al.*, 1993). Maps of the distribution before and after a conventionnal date are used to estimate the faunistic drift.

RESULTS AND DISCUSSION

No Mediterranean species seems to be in significative regression (e.g. *Ceratina dallatorreana* Friese, Fig. 1). The apparent expansion of certain species is probably the result of an increasing survey during last decades.

The northern population of *Ceratina chalybea* Chevrier are concentrated in Alsace and Baden-Wurttemberg (Fig. 2). Westrich (1990) estimates that this species is in regression. It must be observed that, despite a significant increase of survey in recent time, in the southern part of its distribution some places remain free of all recent data, as in Banyuls area, Bouches-du-Rhône, center of Var. We have no explanation of this apparent regression.

Ceratina cucurbitina (Rossi) is limited to the North by the latitude of Paris and Karlsruhe (Fig. 3). It does not seem to suffer from any regression process despite the opinion of Westrich of a slight local regression.

In the North of the studied region, *Ceratina cyanea* (Kirby) seems to be more abundant in warmer stations surrounding chalky grass (Belgian coast, Mons area, Meuse and Rhine valleys) (Fig. 4). There are no indications of any regression even in Baden-Wurttemberg (Westrich, 1990). On the opposite, it has showed some expansion of population in Sweden (Janzon & Svenson 1988).

Xylocopa valga Gerstaecker is only abundant in South-Eastern France (Fig. 5). Out of this area, it is everywhere scarce and localised and it does not reach anywhere the Atlantic coast, marking so continental climatic preferences.

The case of *Xylocopa violacea* (L.) is very special (Fig. 6). Although our data have increased considerably since Heath & Leclercq (1981), we have only few data from Mediterranean region prior to 1940 (only 315 records). So, it is impossible to discuss the dynamics of southern populations. North of latitude 45° (Valence), the species seems to have been much more abundant during the 30s and the 40s than before and after this period (Tab. 1).

Table 1. Number of specimens of *Xylocopa violacea* collected in Belgium and adjacent areas.

decades	number of specimens
<1900	4
1900-1909	9
1910-1919	1
1920-1929	7
1930-1939	52
1940-1949	15
1950-1959	19
1960-1969	2
1970-1979	6
1980-1989	2
1990-1994	2

Sneyers *et al.* (1990) have observed that a little climatic optimum occurs during the 20s. It is possible that the provisional abundance of *X. violacea* until 1950 was a consequence of this climatic optimum. The distribution of *X. violacea* seems to follow the classical extension ways of thermophilic species (Meuse and Rhine valleys, Müller 1971). Since the maximum of abundance in Belgium, Rhine region and Switzerland occurred just after the climatic optimum, we suggest here that the distribution of this species is mainly controlled by climate.

For *Xylocopa iris* (Christ), the extension of distribution toward North seems to be very localised. It does not go beyond the level of the Loire valley.

CONCLUSION

Mediterranean species of carpenter bees do not seem to suffer from any regression process in studied regions. Some Euro-Mediterranean species with more extended distribution seem to have a stable situation: *C. cyanea*, *C. cucurbitina*, *X. valga* and *X. iris*. The other Euro-mediterranean species, *X. violacea* and *C. chalybea*, seem to be less stable. *X. violacea* seems to extend and to regress quickly following thermophilic paths and in response to climatic tendencies. *C. chalybea* seems to regress not only at its northern margin but also in some of its southern stations.

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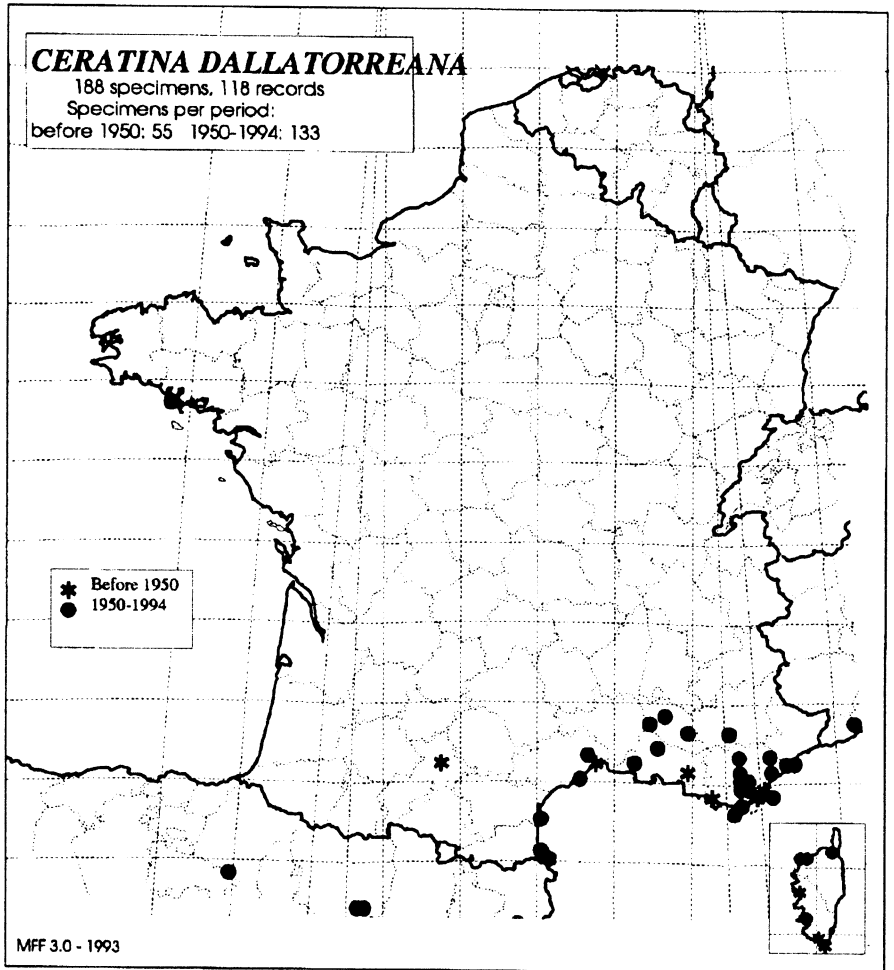


Figure 1. Distribution of *Ceratina dallatorreana* Friese in France, Belgium and adjacent areas

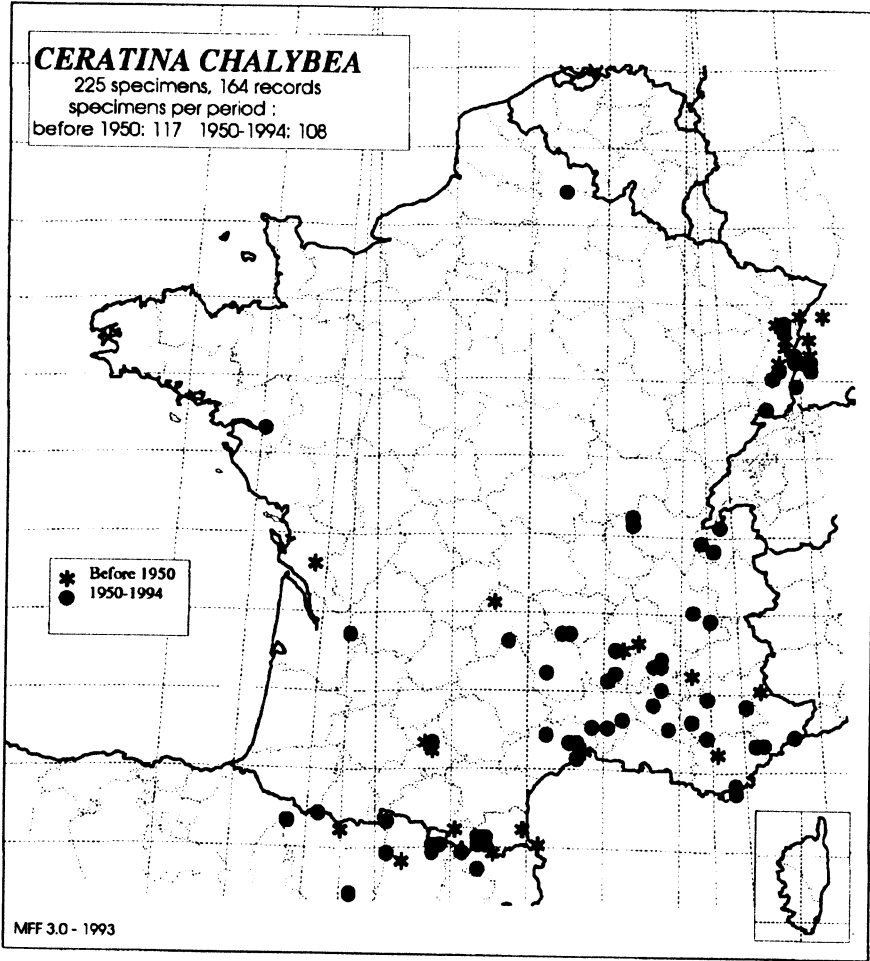


Figure 2. Distribution of *Ceratina chalybea* Chevrier in France, Belgium and adjacent areas

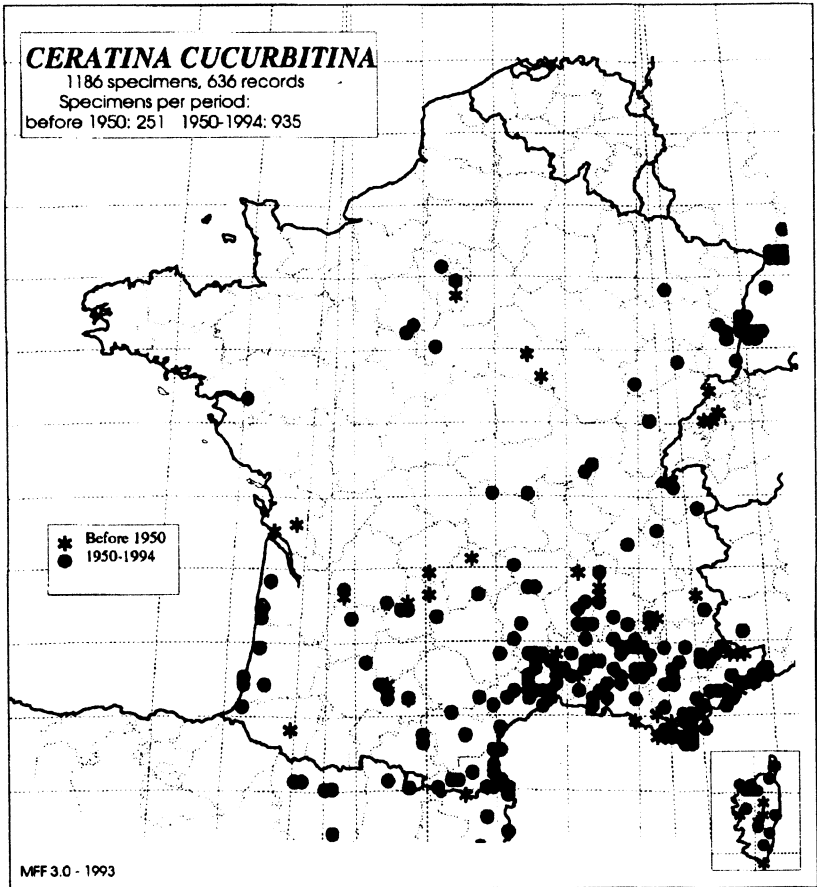


Figure 3. Distribution of *Ceratina cucurbitina* (Rossi) in France, Belgium and adjacent areas

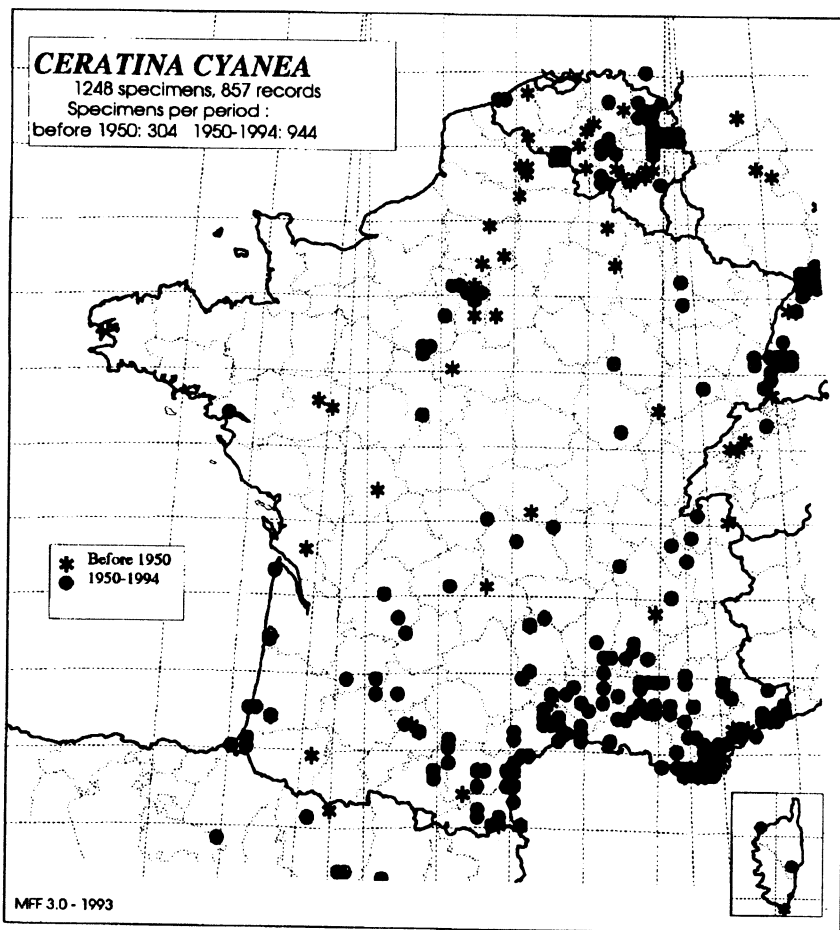


Figure 4. Distribution of *Ceratina cyanea* (Kirby) in France, Belgium and adjacent areas

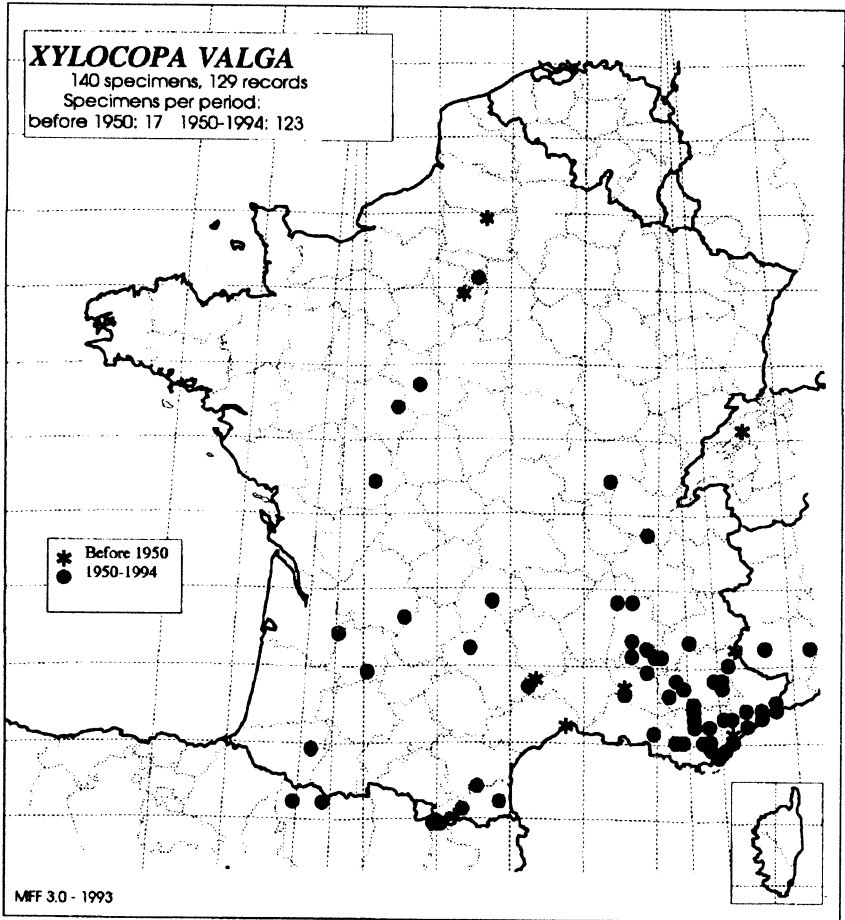


Figure 5. Distribution of *Xylocopa valga* Gerstaecker in France, Belgium and adjacent areas

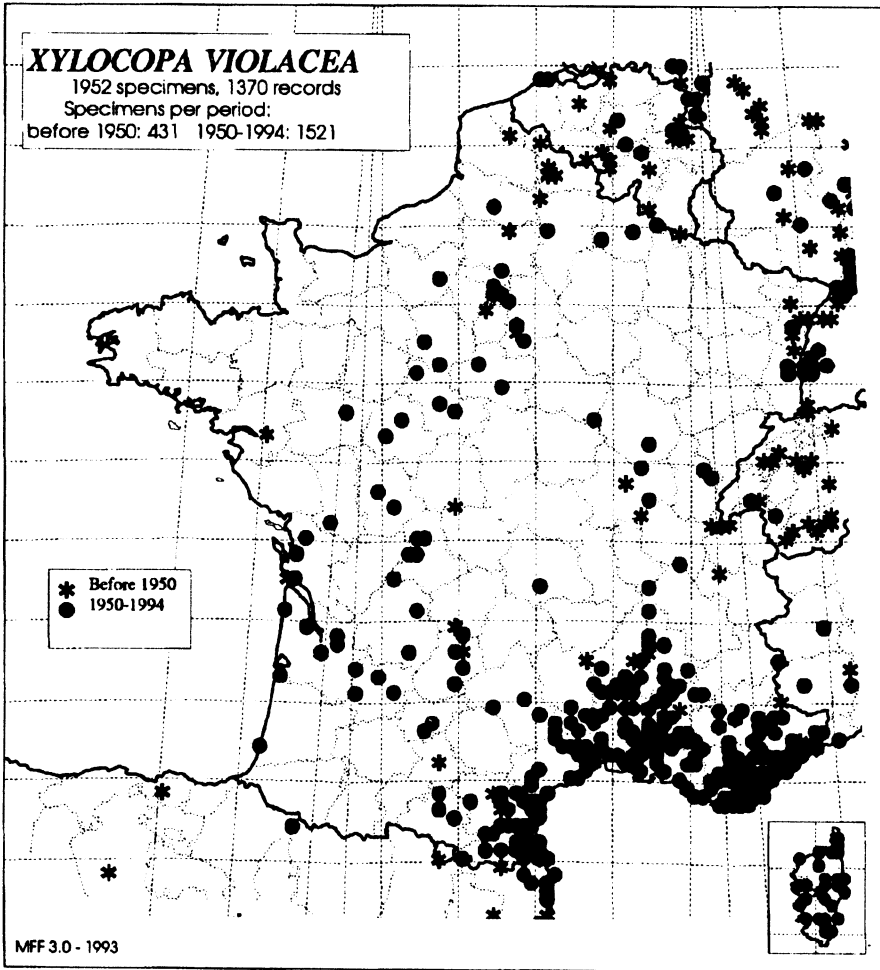


Figure 6. Distribution of *Xylocopa violacea* L. in France, Belgium and adjacent areas