

Hymenoptera Aculeata from “Parc national du Mercantour” (France) and “Parco delle Alpi Marittime” (Italy) in the south-western Alps

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Zusammenfassung

Christian Schmid-Egger: **Hymenoptera Aculeata Hymenoptera Aculeata aus dem “Mercantour”-Nationalpark (Frankreich) und dem “Parco delle Alpi Marittime” (Italien) in den Seealpen.** Der Autor untersuchte in den Jahren 2009 und 2010 für insgesamt 22 Tage die Stechimmenfauna des „Parc national du Mercantour“ in den südfranzösischen Alpen sowie des unmittelbar angrenzenden “Parco delle Alpi Marittime“ im italienischen Piemont. Insgesamt konnten 3083 Individuen ausgewertet werden, die zu 472 Arten gehören. Darunter sind 256 Wildbienen- und 216 Wespenarten. Die hohe Artenzahl erklärt sich aus der Vielfalt der untersuchten Biotope, die von mediterranen Magerrasen und Blockschutthalden in 400 m Meereshöhe bis hin zu hochalpinen Matten in 2600 m reicht.

Das Untersuchungsgebiet weist mehrere faunistische Besonderheiten auf. In den mediterran geprägten Trockenhabitaten konnten mehrere sehr seltene südwesteuropäisch verbreitete Stechimmenarten nachgewiesen werden. Ein Beispiel ist die Faltenwespe *Lep-tochilus moustierensis*, die mit dem aktuellen Fund überhaupt erst in drei Sammlungsexemplaren vorliegt. In den Hochlagen wurden verschiedene auf die Südalpen beschränkte Wespenarten gefunden, die bisher zum Teil nur von ganz wenigen Fundorten bekannt geworden sind. Beispiele sind die Grabwespe *Diodontus wahisi* und die Goldwespe *Philoctetes putoni*. Außerdem war auffällig, dass zahlreiche Stechimmenarten im Untersuchungsgebiet noch bis in 2000 m Meereshöhe gefunden wurden, während diese Arten in den südlichen Zentralalpen nur deutlich tiefer vorkommen.

Summary

The author examined aculeate wasps and bees in the French “Parc national du Mercantour” in the southern Alps and in the neighbouring Italian “Parco delle Alpi Marittime” in Piemonte during three field trips in 2009 and 2010. Together 3083 specimens were examined, which belong to 472 species (256 bee species and 216 wasp species). The examined area includes some faunistic particularities. In lower Mediterranean biotopes some very rare species occur with a southwest European distribution. An example is the Vespidae *Lep-tochilus moustierensis*. In the higher alpine grassland some rare alpine species occur with a close restriction to the southern French Alps only, such as the digger wasp *Diodontus wahisi* or the chrysidid wasp *Philoctetes putoni*.

Introduction

The species diversity of Aculeate wasps and bees in the southern French and Italian Alps is nearly unknown. Benoist (1928) published some data about Apidae from the Mercantour area. Otherwise, only scattered findings from this area are reported in various publications. During the summer of 2009 and 2010 I had the opportunity to participate in a research project of the European Distributed Institute of Taxonomy (EDIT). The project is assessing the fauna and flora of some European National Parks. I visited the French “Parc national du Mercantour” in the department “Alpes Maritimes” and the neighbouring Italian “Parco delle Alpi Marittime” in Piemonte during three field surveys. In overall I could spend about 22 days in the field.

EDIT (www.atbi.eu) is the collective answer of 29 leading European, North American and Russian institutions to a call of the European Commission, issued in 2004, for a network in “Taxonomy for Biodiversity and Ecosystem Research”. It started in 2006 and will receive funding by the European Commission for five years. So far, EDIT has established three so called European ATBI+M pilot sites during 2007, 2008 and 2010, with ATBI+M standing for “All Taxa Biodiversity Inventories + Monitoring”, i.e. large-scale field work efforts to record, identify, and document the entire biodiversity of a given area.. The first pilot site is located in the National Parks Mercantour (France - www.atbi.eu/mercantour-marittime) and

Alpi Marittime (Italy), the second one in the Gemer region (Slovakia - www.atbi.eu/gemer) and the third in the Biosphere Reserve Spreewald (Germany - www.atbi.eu/spreewald). The research of the author was supported by an EDIT grant.

The Alpi Marittime Natural Park and the Mercantour National Park are located in the south-western part of the Alps and cover 2 330 km² in total (including peripheral areas). The Mercantour/Marittime territory (Figure 1) lies at the crossroads of climatic and biogeographical factors (continental, alpine and Mediterranean climate influences) and benefits from a great diversity of altitudes, exposures as well as geological and pedological substrates. This set of characteristics makes the area a hotspot of biodiversity with an indispensable value in terms of biological species richness.

The examined area includes a wide variety of habitats from the higher Alpine mountains to xerothermic dry meadows in the low river valleys. The altitude of both Parks ranges from around 350 m (above sea level) to 3267 m on the highest peak in the area, the Monte Argentera in Alpi Marittime. Due to the wide range of habitats and vertical vegetation zones (from Mediterranean oak forest to Alpine grassland) the fauna is very rich in species and ranges from Alpine species to species with a Mediterranean distribution.

Material and Methods

Collecting methods

In 2009 and 2010 I could visit both Parks for three times. I spend three days in June 2009 and two days in July 2009 in the Alpi Marittime Park, and eight days in July 2009 and nine days in July 2010 in the Mercantour Park. During this time, I could examine most parts of the Parks, as well as a wide variety of habitats, from xerothermic habitats with a mediterranean vegetation and fauna in 400m up to Alpine grassland in about 2600m. Due to the unusual long winter in 2010, vegetation and fauna was approximately 3- 4 weeks later in development in July, compared with the collecting period in July 2009.

Specimens were collected by hand netting, as well as with yellow pan traps. I used pan traps in most locations for one day or shorter. The results of each method are not mentioned here, but data are available for further study. Yellow pan traps mostly collected Pompilidae, Chrysididae, small Crabronidae and some genera of Apidae like *Lasioglossum*. I used about 20-30 yellow pan traps during each sampling day. They had a diameter of about 30 cm, with 3 cm height, and were filled with water and some dishwashing liquid inside. All collected specimens are pinned and stored in the collection of the author. Some specimens were used for DNA extraction in the Barcoding project from the "Zoologische Staatssammlung München" in Germany and are stored in the München collection.

Habitats

The term **meadow** is used here in its original sense to mean a haymeadow, what means grassland cut annually for hay. It is not differentiated here from land which is primarily grazed by cattle ("grass pasture"). **Alpine grassland** is used for grassland, which was obviously not influenced by man, cattle or other domesticated animals.

Most collecting places in the lower areas are open **xerothermic** habitats. Open means that vegetation is scattered and open ground parts are available. Most of them originate from ancient vineyards or fields, or from large boulder areas. Only few of them comply with the definition of the **Steppenheide** habitats. "Steppenheide" is described from the large central Alpine valleys (e.g. Wallis in Switzerland or Aosta Valley in Italy).

Collecting Locations

All locations are sorted for Italy and France, and are listed alphabetically below and in the species list. Longitude and latitude as well as some additional information about habitats and collecting data are given. A few locations were visited twice. The related collecting period is marked under "records" as follows: A = June 2009, B = July 2009, C = July 2010. The altitude of the collecting place is also given in the material list for a direct comparison with the collecting altitude.

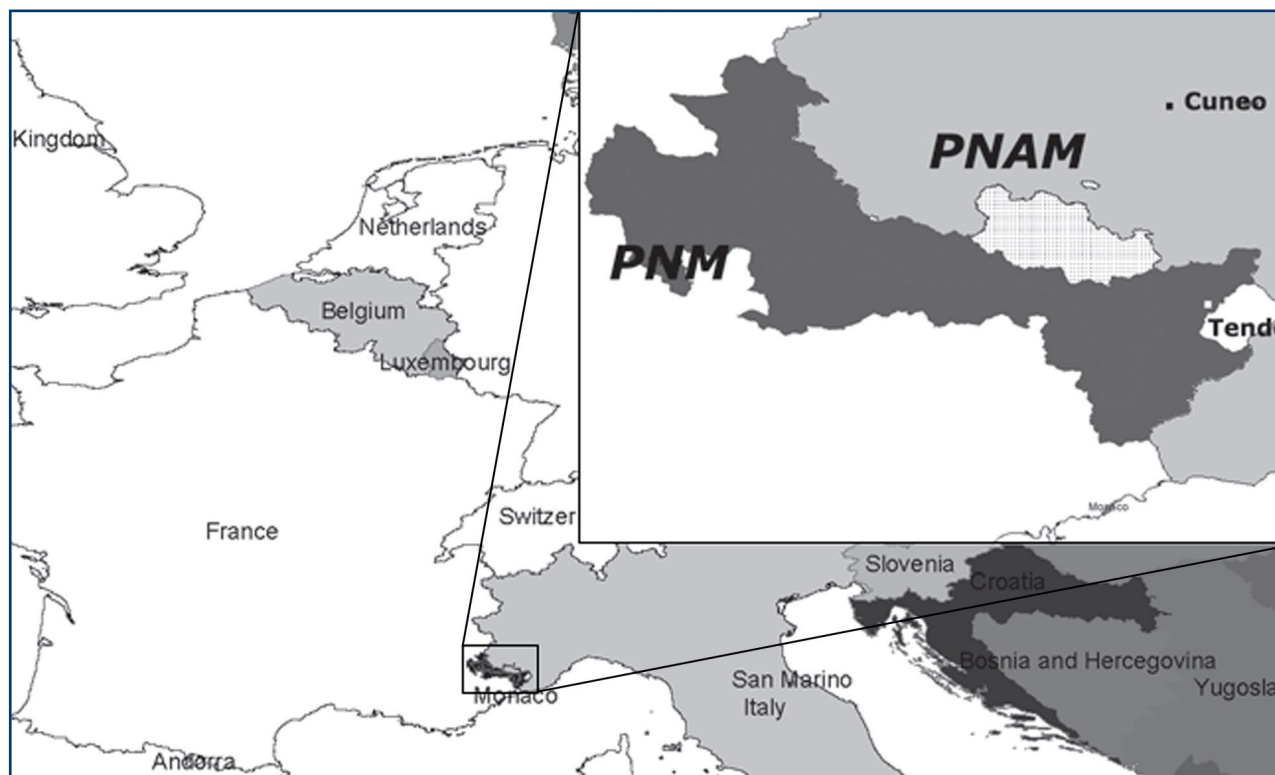


Fig 1: Position of the Mercantour/Marittime territory, with a close-up of Mercantour National Park (PNM) and Alpi Marittime Natural Park (PNAM)

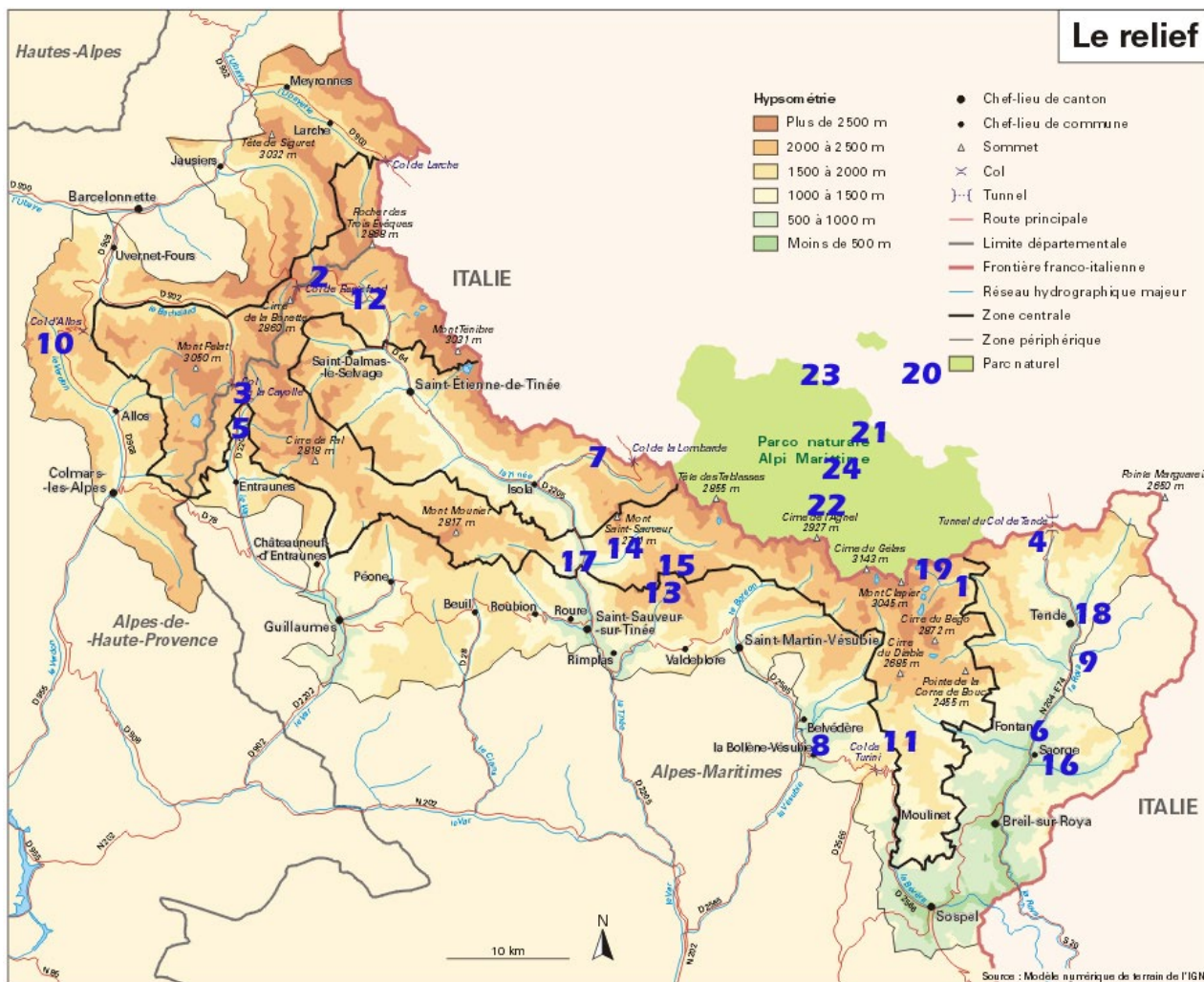


Fig. 2: Collecting localities in Mercantour National Park and Alpi Marittime Natural Park. Numbers are explained in the text.

Collecting locations in the Mercantour Park in France

Only one location, La Foux d’Allos, is situated in the department Alpes de Haute Provence, the remaining in the department Alpes Maritimes.

1. Casterino/1700m.

Casterino is a very small village west of Tende, and the collecting place was 2 km NNW of Casterino 44.116 N 7.490 E. Collecting date: 09.07.2010. Habitat: Meadow near forest.

2. Col la Bonette/2300m

Col la Bonette is on the north-western Park border, and represents the highest point reachable by car in the Alps (2800 m). I put yellow pan traps east of Col la Bonette, in the Camp de Fourches, an old military village in 2300 m: 44.3337 N 6.8693 E. Collecting date: 17.07.2009.

3. Col de Cayolle

I collected in various places between on the south side between the foothill of Col de Cayolle to the highest point of the street, and some kilometres south of the Col in the mountains. Collecting date was 14.07.2010,



Fig. 3: The collecting places on the southern part of Col de Cayolle in the western part of the Mercantour parc.



Fig. 4: *Zygaena occitanica* (VILLERS, 1789) has a south-western european distribution pattern. The present specimen was found in Saorge..

habitats were Alpine grasslands, and on 2180 m a steep hillside with boulder. Exact data are as follows:

- Col de Cayolle/1860 m, south of Col, Park Entrance, 44.244 N 6.756 E
- Col de Cayolle/2180m, south of Col, near street 44.254 N 6.750 E
- Col de Cayolle/2300m South of Col, pathway southwards to mountains, 44.253 N 6.742 E.

4. Col de Tende

The main collecting place in 2010 was the old military road between the Col and the Fort de Marguerite, about 2 kilometres west of Col de Tende. In 2009 I collected southwards some 100 meters below. Habitat was Alpine grassland, partly also meadow. Dates are:

- Col de Tende/B/1400m: South of Col du Tende, near Tunnel 44,1423 N 7,5679 E Collecting date: 12.07.2009
- Col de Tende/C/1830m around Fort de Marguerite 44.139 N 7.549 E, Collecting date: 08.07.2010



Fig. 5: The collecting place near Col de Tende in the Fort Marguerite.

5. Estenc/1800m

Estenc is a small village south of Col de Cayolle, and the collecting place was a steep hillside with boulders, 0.5 km N of Estenc 44.240 N 6.751 E near the road, Collecting date: 14.07.2010.

6. Fontan/400m

Fontan is a village in the Roya valley in the south-eastern part of the Park. The collecting place was 1 km S of Fontan, on the entrance of the Cayros valley: 43.9951 N 7.5496 E Collecting date: 13.07.2009. Habitat was a steep hillside with xerothermophil shrub vegetation.

7. Isola

Isola is a village in the central northern part of the Park in the Tinée valley. I collected near the village, halfway on the road to the Ski village Isola 2000 and around Isola 2000. Places in detail:

- Isola village/900m 44.1849 N 7.0572 E. Collecting date: 14.07.2009. Collecting place was the hillside east of Isola near the street, with boulder and xerothermophil shrub vegetation.
- Isola/1600m. The collection place is about 8 km SW Isola 2000: 44.2082 N 7.0989 E 1591 m . Collecting date: 14.07.2009. I collected near the road on meadows and Alpine grassland, next to a wooden old house.
- Isola/2000m Collecting places were around Isola 2000 on various meadows: 44.1883 N 7.1530 E 1900 m . Collecting date: 14.07.2009

8. La Bollène/630m

La Bollène-Vésubie is about 8 km SE of St. Martin-Vésubie near the Vésubie valley. Collecting place was a steep hillside with xerothermophil shrub vegetation, about 1 km N of La Bollène on the small road to Flaut. 43.998 N 7.339 E 630 m. Collecting date: 12.07.2010.

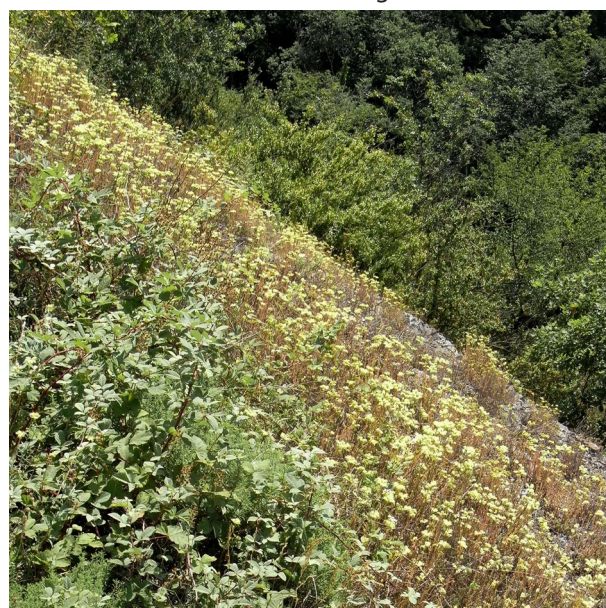


Fig. 6: Flowering *Sedum* plants in la Bollène

9. La Brigue/800m

La Brigue is situated in a side valley of the Roya valley on the eastern border of the Mercantour Park. Collecting place was the steep hillside with xerothermophil shrub vegetation north of the village, along a small pathway to the mountains: 44.065 N 7.618 E 800 m. Collecting date: 10.07.2010. La Brigue lies shortly outside of the Park, but records from this place were included, because they belong to the same zoogeographic area as the neighbouring Saorge or Tende.



Fig. 7: La Brigue is a typical collecting location in the Roya valley in the eastern part of the Mercantour Parc.

10. La Foux-d'Allos/1900m

La Foux-d'Allos is a ski village at the end of the Verdon valley on the western border of the Park, south of Col d'Allos. It is the only collecting place in the department "Alpes de Haute Provence": 44.294 N, 6.564 E. Collecting date: 15.07.2010. I collected on a pathway north of the village, along the hillside. Habitat was the stony border of the pathway between meadows.



Fig. 8: L'Authion is an isolated pic in the southern part of the parc. Here is the collecting place of *Andrena rogenhoferi*.

11. L'Authion/2000m

L'Authion is an isolated mountain in the southern-central part of the Park, 2 km NE of the famous Col Turini, known by the Rally Monte Carlo. I collected on various places around the cross road around the peak of L'Authion, mainly near the castle on the top: 3.990 N 7.407 E. Collecting date: 11.07.2010

12. Le Pra/1700m

Le Pra is a small village E of Col la Bonette on the end of the Tinée valley. Collecting place was a small river valley north of Le Pra to the mountains: 44.3238 N 6.8836 E 1700 m. Collecting date: 17.07.2009. Habitat was Alpine grassland.



Fig. 9: Le Pra is a typical alpine biotope and collecting place for *Omalus putoni* and other rare species.

13. Millefont

Millefont is a very nice collecting place 6 km NW of St. Martin-Vésubie, north of the village St. Dalmas-Valdeblore. Collecting place was at the end of the small road from St. Dalmas, W of the parking. In both years I collected near the pathway, going westwards from the parking: 44.1025 N 7.1721 E. Collecting date: 15.07.2009 (B) and 13.07.2010 (C). Habitat is Alpine grassland with large boulder areas along the pathway.



Fig. 10: Millefont was the most famous collecting place for alpine species in the present examination.

14. Mollières

Vallon de Mollières is a deep and narrow side valley of the Tinée valley, 11 km NW of St. Martin-Vésubie. I collected in the whole valley between the parking in the Tinée valley and the village of Mollières at the end of the valley. The findings from around the village are separated from the remaining findings: Collecting date: 16.07.2009

- Mollières valley/800-1400 m, mostly collected in 1100 m: 44.1410 N 7.1516 E 800-1400 m.
- Mollières/1600m: Meadows around Mollières village: 44.1557 N 7.1839 E.

15. Mont Giraud/2500m

Mont Giraud is a mountain area 1-2 kilometres north of Millefontes (location 10), and south of Vallon de Mollières (location 14). I collected near the ride along the Mollières Valley, around 2400-2600 m on Alpine grassland. The ride is the border of the inner zone of the Mercantour Park.

16. Saorge/700m

Saorge is a famous village above the Roya valley in the rocks. I collected in the area 2-3 km E of Saorge: 43.9882 N 7.5691, within ancient fields and vineyards with a scattered shrub and grassland vegetation, mostly with xerothermophil plants. Collecting date: 13.07.2009



Fig. 11: The Lac Vert in Valmasque represents a typical higher alpine collecting place near the central mountain range.

17. St. Sauveur/700m

Collecting place was 6 km N of St.-Sauveur-sur-Tinée in the Tinée valley, north of the entrance of the Vallon de Mollières (location 14). Here I placed yellow pan traps along the old road, with a steep and stony hillside with some shrub vegetation: 44.1351 N 7.1002 E. Collecting date: 16.07.2009

18. Tende/900m

Collecting place was the hill N of Tende 44.0968 N 7, 6018. I collected along the pathway on the hill, in a range of 700-1100 m. Collecting date: 12.07.2009. The hill is steep with dense shrubland vegetation of the "Steppenheide"-type.

19. Valmasque/2200m

The Valmasque valley starts near Casterino (location 1) westwards and ends near "Lac Vert". I collected mainly in the steep hillside directly below Lac Vert in 2200 m: 44.105 N 7.448 E. Collecting date: 09.07.2010. Habitat was Alpine grassland along the rocky pathway.

Collecting locations in the Alpi Marittime Park (Piemonte, Italy).

20. Brignola/700m

Brignola is outside of the Park about 5 km NE of Entraque on the road to Cuneo. Collecting place was the former limbstone pit N of Brignola: 44.2960 N 7.4559, Collecting date: 17.06.2009. The place was taken into account because it represents a typical habitat of the large limbstone area on the northern limit of the Park.

21. Entraque/900m

Entraque is the village on the Park entrance, 20 km SW of Cuneo: 44.250 N 7.394 E. Collecting date: 17.06.2009. I collected in some places on the hillside S of Entraque.



Fig. 12: *Lilium martagon*, a very impressive plant of the Alps and related areas.

22. Lago Rovine/A/1700m

Lago delle Rovine is in the centre of the Park SW of Entraque: 44.1853 N 7.3456 E. Collecting date: 17.06.2009. I collected on a paved pathway which starts on northern border of the lake to the right hand side (westwards) to the hillside (1500-1700m). Habitat was a large boulder area with some shrub vegetation, and partly Alpine grassland. Most specimens were collected along the pathway.

Collecting date: 17.06.2009 (A) and 10.07.2009 (B).

23. St Lorenzo/1300m

Along the northern border of the Park west of Valdieri is a valley with Alpine grassland vegetation and some forest. I collected mainly west of the village San Bernado along the pathway to the mountains: 44.2718 N 7.3305 E, and a few records are also from the road between St. Bernado and St. Lorenzo. Collecting date: 10.07.2009

24. Tetti Grella/980m

Tetti Grella is a place below Entraque and Lago Rovine in the Park: 44.2062 N 7.3798 E 980 m. Collecting date: 17.06.2009. Habitat was a meadow along the river.

Valle Maira

Valle Maira is a valley west of Cuneo and about 35 km NW of the Park entrance near Entraque. Because of rain in the Park I collected for one day in Valle Maira. I add these data here, because specimens may also occur in the Parco delle Alpi Marittime. 13 species were collected in Valle Maira only, but not in the Park. Both collecting places were dry hillsides with the vegetation type "Steppenheide".

25. Valle Maira/Macra/900m

Macra is E of San Damiano: 44.490 N 7.250 E. I collected near the village on the hillside north of the river. Collecting date: 16.06.2009.

26. Valle Maira Stropo/1300m

Stropo is at the end of the lower parts of the valley. I collected near the village on the hillside north of the river. 4.500 N 7.130 E. Collecting date: 16.06.2009.

Distribution

I use a simplified distribution pattern system here, what does not include the zoogeographical pattern by de Latтин (1967) or others. Some special distribution patterns are discussed separately with the species. The following types of distribution are used here:

- **Mediterranean:** distribution of the species is restricted to the Mediterranean zone only. Species may re-

ach the lower areas of the southern Alps in northern Italy, but do not reach Switzerland or do not cross the Alps northwards.

- **SW-Mediterranean:** the same as the Mediterranean species, but in Europe restricted to France, Portugal and Spain only.
- **Submediterranean:** Species occur more northwards than Mediterranean species. Northern limit of distribution is Switzerland, some species also reach the southwestern part of Germany in the Rhine valley.
- **SW-Submediterranean:** the same as submediterranean species, but in Europe restricted to France, Spain and Portugal only, some reach also western Italy or SW-Germany.
- **European:** Species occur in whole Europe, their northern limit is in mid or northern France and Germany, most of them also occur in Scandinavia. Most of them have a wider distribution in Asia and Africa too.
- **Alpin:** Species are restricted to the higher areas in the Alps (above 1800 m). Some of them also occur in other higher European or Asian mountains outside of the Alps.
- **Montan:** The same as the Alpine species, but these species occur also in deeper areas (between 1200 and 1800 m) and in the low mountain ranges north of the Alps.

Identification and nomenclature

I identified most specimens using the nomenclature from the literature mentioned below. In Apidae I follow Amiet with the genus concept and do not divide genera as *Osmia* or *Anthidium* into smaller genera. For *Osmia* s. lat. and *Anthidium* s. lat., see also Scheuchl (2006) who gives an survey about the genus concept of Michener (2000).

- **Apidae:** Amiet et al. (1996-2007), Scheuchl (1995, 2006), Schmid-Egger & Scheuchl (1997).
- **"Sphecids":** Ampulicidae, Crabronidae and Sphecidae: Bitsch et al. (1993-2001)
- **Pompilidae** (Schmid-Egger in prep., key to the Pompilidae of Central Europe)
- **Vespidae:** For Eumeninae and Celonites: Gusenleitner (2000) and additional literature, mentioned in Gusenleitner (2000). For Vespinae and Polistinae: Mauss & Treiber (2004), for Masarinae: Richards (1962).
- **Mutillidae, Sapygidae, Scoliidae und Tiphiidae:** Amiet (2009), Mutillidae only: Lejeu & Schmid-Egger (2005).
- **Chrysididae:** There is no modern key for species of the target area, but Rosa (2006) keyed and revised most species of the Southern Alps.

It was not possible to identify all species of Apidae with the mentioned literature. The following experts identified and verified single specimens: Erwin Scheuchl (*Andrena*). P. Andreas Ebmer (*Halictus* and *Lasioglossum*), Andreas Müller (*Osmia* s. lat.), Christophe Praz (*Megachile*), Stefan Risch (*Eucera*), and Maximilian Schwarz (*Nomada*). All Chrysididae were examined by Paolo Rosa, *Tachysphex* (Crabronidae) by Jakub Straka, and *Crossocerus* (Crabronidae) of the *elongatulus*-group by Hans-Joachim Jacobs.

The species of the family Apidae are treated as “Bees”, and the remaining species of Aculeata families are summarized with “Wasps” in the text and in the discussion. For the examined area I use the term “Park”. It means both national Parks, Mercantour and Alpi Marittime.

Records

The number of collected specimen is given for males (♂) and females (♀) separately.

Family Ampulicidae

Dolichurus bicolor Lepeletier, 1845

Records: France, Millefonds/C/2030m 1♀.

Distribution: European.

Dolichurus corniculus (Spinola, 1808)

Records: France, Le Pra/1700m 1♂, Millefonds/C/2030m 1♂ 1♀, Italy, Brignola/700m 3♂, St Lorenzo/1000m 1♂.

Distribution: European.

Family Apidae

Andrena alutacea E. Stoeckhert, 1942

Records: France, Le Pra/1700m 1♂ 1♀ Italy, Brignola/720m 1♂, Lago Rovine/B/1700m 1♂, Lago Rovine/B/1700m 2♂.

Distribution: European. The species has an eastern-central European distribution from Turkey to Austria, south-eastern Germany and eastern Switzerland (Schmid-Egger 2005). The population in the examined area is isolated from the remaining distribution area.

Andrena asperrima Perez, 1895

Records: France, Tende/900m 1♀.

Distribution: SW-Mediterranean.

Andrena barbareae Panzer, 1805

Records: France, Le Pra/1700m 1♂ 1♀, Tende/900m 2♂, Italy, Lago Rovine/B/1700m 1♀.

Distribution: Montane.

Andrena bicolor Fabricius, 1775

Records: France, Casterino/1700m 1♀, Col de

Cayolle/2350m 1♂ 1♀, Col de Tende/B/1400m 1♀, Col de Tende/C/1830m 1♀, Col de Tende/C/1830m 1♀, L'Authion/2000m 1♀, Le Pra/1700m 1♀, Millefonds/B/2030m 1♀, Mollières valley/1100m 1♀, Italy, Lago Rovine/B/1700m 1♂ 3♀, St Lorenzo/1000m 1♂, Valle Maira/Macra/900m 1♂.

Distribution: European.

Andrena combinata (Christ, 1791)

Records: Italy, Lago Rovine/A/1700m 3♀.

Distribution: European.

Andrena congruens Schmiedeknecht, 1883

Records: France, Isola/1600m 6♀, La Foux-d'Allos/1900m 1♀, L'Authion/2000m 1♀, Le Pra/1700m 1♀, Mollières/1600m 1♀.

Distribution: European.

Andrena curvungula Thomson, 1870

Records: France, Millefonds/B/2030m 1♀, Mollières valley/1100m 1♀.

Distribution: European.

Andrena dorsata (Kirby, 1802)

Records: France, Fontan/400m 1♀, Tende/900m 13♀.

Distribution: European.

Andrena falsifica Perkins, 1915

Records: France, Millefonds/C/2030m 5♀.

Distribution: European.

Andrena flavipes Panzer, 1799

Records: France, Col de Tende/B/1400m 1♀, Saorge/700m 1♀, Tende/900m 8♀.

Distribution: European.

Andrena fulvago (Christ, 1791)

Records: Italy, Lago Rovine/A/1700m 4♂ 1f.

Distribution: European.

Andrena fulvata E. Stoeckhert, 1930

Records: Italy, Lago Rovine/A/1700m 3♀, Valle Maira/Stroppo/1300m 1♀,

Distribution: European.

Andrena gelrae E. Stoeckhert, 1930

Records: France, La Brigue/800m 1♂.

Distribution: European.

Andrena haemorrhhoa (Fabricius, 1781)

Not collected in the Park. Records: Italy, Valle Maira/Stroppo/1300m 1♂.

Distribution: European.

Andrena hattorfiana (Fabricius, 1775)

Records: France, Col de Tende/C/1830m 1♀.

Distribution: European.

Andrena humilis Imhoff, 1832

Records: France, Millefonds/B/2030m 7♀.

Distribution: European.

Andrena intermedia Morawitz, 1870

Records: France, Casterino/1700m 1♂, Col de Tende/B/1400m 1♀, Col de Tende/C/1830m 1♂ 3♀, La Bollène/630m 2♀, L'Authion/2000m 1♀, Le Pra/1700m 4♂ 1♀, Millefonds/B/2030m 5♂ 3♀, Mollières/1600m 1♂, Valmasque/2200m 1♂, Italy, Lago Rovine/A/1700m 16♂ 2♀, Lago Rovine/B/1700m 1♂ 2♀.

Distribution: Montane.

Andrena labiata Fabricius, 1781

Records: France, Col de Tende/C/1830m 2♀, Le Pra/1700m 1♀, Millefonds/C/2030m 2♂ 1♀, Valmasque/2200m 1♂.

Distribution: European.

Andrena limata Smith, 1853

Records: France, Col de Tende/C/1830m 2♀.

Distribution: Submediterranean, northwards to southern Germany.

Andrena minutula (Kirby, 1802)

Records: France, Col de Tende/B/1400m 2♀, La Bollène/630m 1♀, La Brigue/800m 1♀, Mollières valley/1100m 3♀, St.Sauveur/700m 2♀, Tende/900m 7♀, Italy, Brignola/700m 1♀, St Lorenzo/1000m 2♀.

Distribution: European.

Andrena minutuloides Perkins, 1914

Records: France, La Brigue/800m 1♀, Le Pra/1700m 2♀, Tende/900m 2♀, Italy, Brignola/720m 1♀, Tetti Grella/980m 2♀.

Distribution: European.

Andrena montana Warncke, 1973

Records: France, Mont Giraud/2500m 1♀.

Distribution: Alpine.

Andrena nigroaenea (Kirby, 1802)

Records: France, Col de Tende/C/1830m 7♀, Tende/900m 1♀, Italy, Lago Rovine/A/1700m 1♀.

Distribution: European.

Andrena nitida (Müller, 1776)

Records: Italy, Lago Rovine/A/1700m 1♂ 1♀, Lago Rovine/B/1700m 1m.

Distribution: European.

Andrena nuptialis Pérez, 1902

Records: France, Col de Tende/B/1400m 1♀, Isola/1600m 1, Le Pra/1700m 1♀, Italy, Valle Maira/Stroppo/1300m 1♀.

Distribution: European.



Fig. 13: A female of *Andrena nuptialis* on any *Apicac* flower.

Andrena ovatula (Kirby, 1802)

Records: France, Saorge/700m 1♀, Tende/900m 5♀.

Distribution: European.

Andrena paucisquama Noskiewicz, 1924

Records: Italy, Tetti Grella/980m 1♂.

Distribution: European.

Andrena rogenhoferi Morawitz, 1872

Records: France, La Foux-d'Allos/1900m 1♀, L'Authion/2000m 7♀.

Distribution: Alpine.



Fig. 14: A female of *Andrena rogenhoferi*, collecting pollen on *Gentiana lutea* near the top of l'Authion (see also fig. 8).

Andrena rufizona Imhoff, 1834

Records: France, Mollières valley/1100m 1♀, Italy, Entraque/900m 1♀, Lago Rovine/B/1700m 1♂ 1♀.

Distribution: Montane.

Andrena semilaevis Pérez, 1903

Records: France, Col de Cayolle/2300m 1♀, Col de Cayolle/2350m 2♀, Col de Tende/C/1830m 2♀, Isola/2000m 1♀, La Bollène/630m 1♂, Mont Giraud/2500m 1♀, Italy, Lago Rovine/A/1700m 4♀, Lago Rovine/B/1700m 2♀.

Distribution: European.

Andrena subopaca Nylander, 1848

Records: Italy, Tetti Grella/980m 2♀.

Distribution: European.

Andrena tarsata Nylander, 1848

Records: France, Le Pra/1700m 2♂ 1♀, Millefontes/B/2030m 1♀.

Distribution: Montane.

Anthidium brevisculum Perez, 1890

Records: France, La Brigue/800m 1♀.

Distribution: Mediterranean.

Anthidium byssinum (Panzer, 1798)

Records: France, Col de Cayolle/2350m 1m, Italy, Valle Maira/Macra/900m 1♂ 1♀,

Distribution: European.

Anthidium caturigense Giraud, 1863

Records: France, La Bollène/630m 3♀, La Brigue/800m 1♀, Tende/900m 1♀, Italy, Valle Maira/Macra/900m 1♂, Valle Maira/Stroppo/1300m 1♀.

Distribution: Submediterranean.

Anthidium cingulatum Latreille, 1809

Records: France, Fontan/400m 1♂.

Distribution: Submediterranean.

Anthidium florentinum (Fabricius, 1775)

Records: France, Tende/900m 1♂.

Distribution: Mediterranean.

Anthidium interruptum (Fabricius, 1781)

Records: France, Fontan/400m 1♂,

Distribution: Submediterranean.

Anthidium lituratum (Panzer, 1801)

(=*Anthidium tenellum* Mocsasy, 1881)

Records: France, La Brigue/800m 1♂, Tende/900m 1♂.

Distribution: European.

Anthidium loti Perris, 1852

Records: France, Saorge/700m 1♀.

Distribution: Submediterranean.



Fig. 15: *Anthidium loti*, here a female, is a rare mediterranean bee species.

Anthidium manicatum (Linnaeus, 1758)

Records: France, Isola/1600m 1♂ 1♀, La Brigue/800m 1m, La Foux-d'Allos/1900m 1♀, Millefontes/B/2030m 1♀, Mollières valley/1100m 4♂1♀, Tende/900m 1♂, Italy, Brignola/720m 1♀, Lago Rovine/B/1700m 2♂ 2♀, Valle Maira/Macra/900m 1♀.

Distribution: European.

Anthidium oblongatum (Illiger, 1806)

Records: France, Col de Cayolle/1860m♂, La Bollène/630m 1♂ 1♀, La Brigue/800m 2♀, Le Pra/1700m 2♀, Mollières valley/1100m 1♂ 2♀, Saorge/700m 3♀, Tende/900m 1♂ 2♀, Italy, Lago Rovine/B/1700m 1♀.

Distribution: European.

Anthidium punctatum Latreille, 1809

Records: France, Col de Cayolle/1860m 2♂ 1♀, La Foux-d'Allos/1900m 1♂ 1♀, Le Pra/1700m 3♂ 1♀, Tende/900m 2♂, Italy, Brignola/700m 2♀, Valle Maira/Stroppo/1300m 1♀.

Distribution: European.

Anthidium septemdentatum Latreille, 1809

Records: France, Fontan/400m 1♂, Fontan/400m 1♂ 1♀, La Bollène/630m 4♂, La Brigue/800m 2♂, Saorge/700m 4♂ 2♀, Tende/900m 3m, Italy, Brignola/720m 1♀.

Distribution: Submediterranean.

Anthidium strigatum (Panzer, 1805)

Records: France, La Bollène/630m 1♂, La Brigue/800m 1♂, Mollières valley/1100m 1♂, Mollières/1600m 1♂, Saorge/700m 6♂ 3♀, Tende/900m 4♂.

Distribution: European.

Anthophora aestivalis (Panzer, 1801)

Records: France, Col de Tende/B/1400m 1♀, Millefontes/B/2030m 1♀, Italy, Brignola/720m 1♀, St Lorenzo/1000m 1♀, Valle Maira/Macra/900m 1♀.

Distribution: European.

Anthophora albigena Lepeletier, 1841

Records: France, Saorge/700m 5♂.

Distribution: Mediterranean.

Anthophora balneorum Lepeletier, 1841

Records: France, Col de Tende/B/1400m 1♀, La Foux-d'Allos/1900m 2♂ 1♀, Italy, Lago Rovine/B/1700m 1♂ 1♀, Valle Maira/Macra/900♂ 1♀.

Distribution: Submediterranean.



Fig. 16: The bee *Anthophora balneorum* (♀) is a mediterranean species and occurs in warmer valleys of the southern Alps.

Anthophora furcata (Panzer, 1798)

Records: Italy, Lago Rovine/A/1700m 1♂, St Lorenzo/1000m 1♂, Valle Maira/Stroppio/1300m 1♂.

Distribution: European.

Anthophora quadrifasciata (Villers, 1789)

Records: France, Tende/900m 1♀.

Distribution: Mediterranean.

Anthophora quadrimaculata (Panzer, 1798)

Records: France, Col de Tende/C/1830m 1♀, La Foux-d'Allos/1900m 1♀, Mollières/1600m 1♂ 2♀.

Distribution: European.

Anthophora retusa (Linnaeus, 1758)

Records: Italy, St Lorenzo/1000m 2♀.

Distribution: European.

Bombus hortorum (Linnaeus, 1761)

Records: Italy, St Lorenzo/1000m 4♀.

Distribution: European.

Bombus humilis Illiger, 1806

Records: France, L'Authion/2000m 1♀, Italy, Lago Rovine/A/1700m 1♀, Lago Rovine/B/1700m 1♀, St Lorenzo/1000m 3♀.

Distribution: European.

Bombus hypnorum (Linnaeus, 1758)

Records: France, Millefontes/C/2030m 1♀, Italy, Lago Rovine/A/1700m 1♀, St Lorenzo/1000m 1♀.

Distribution: European.

Bombus lapidarius (Linnaeus, 1758)

Records: France, Isola/2000m 2♀, La Bollène/630m 1♀, La Foux-d'Allos/1900m 1♀, L'Authion/2000m 2♀, Millefontes/B/2030m 2♀, Mont Giraud/2500m 2♀, Saorge/700m 1♀, Italy, St Lorenzo/1000m 1♀.

Distribution: European.

Bombus lucorum-aggr.

Records: France, La Brigue/800m 1♀, L'Authion/2000m 1♀, common in many other places, but not collected.

Distribution: European.

Remark: The specimens were not checked for the remaining species of the *lucorum*-group

Bombus mesomelas Gerstaecker, 1869

Records: France, Col de Cayolle/1860m 1♀, Col de Cayolle/2350m 1♀, Col de Tende/B/1400m 1♀, Col de Tende/C/1830m 5♀, Isola/2000m 1♀, L'Authion/2000m 1♀, Le Pra/1700m 2♀, Millefontes/B/2030m 1♀, Mont Giraud/2500m 1♀, Italy, Lago Rovine/A/1700m 1♀, Lago Rovine/B/1700m 2♀, St Lorenzo/1000m 4♀.

Distribution: Alpine.

Bombus monticola Smith, 1849

Records: France, Mollières/1600m 1♀.

Distribution: Alpine.

Bombus pascuorum (Scopoli, 1763)

Records: France, La Bollène/630m 2♀, La Brigue/800m 3♀, Saorge/700m 1♀, Italy, Brignola/700m 1♀, Entraque/900m 1♀, St Lorenzo/1000m 1♀, Valle Maira/Macra/900m 1♀.

Distribution: European.

Bombus pyrenaeus Pérez, 1879

Records: France, Casterino/1700m 3♀, Col de Cayolle/1860m 1♀, Col de Tende/C/1830m 1♀, Isola/2000m 2♀, Mollières/1600m 1♀.

Distribution: Alpine.

Bombus rupestris (Fabricius, 1793)

Records: France, Millefontes/C/2030m 1♀, Italy, St Lorenzo/1000m 1♀.

Distribution: European.

Bombus soroensis (Fabricius, 1776)

Records: France, Col de Tende/B/1400m 2♀, Col de Tende/C/1830m 5♀, Isola/2000m 2♀, L'Authion/2000m

2♀, Le Pra/1700m 1♀, Millefontes/B/2030m 5♀,
Valmasque/2200m 1♀.
Distribution: European.

Bombus wurfleini Radoszkowski, 1877

Records: France, L'Authion/2000m 3♀,
Valmasque/2200m 1♀.
Distribution: Montane.

Ceratina chalcites Germar, 1839

Records: Italy, St Lorenzo/1000m 1♀.
Distribution: Mediterranean.

Ceratina chalybea Chevrier, 1872

Records: France, Fontan/400m 1♂, La Bollène/630m
1♀.
Distribution: Submediterranean, northwards to SW-
Germany.

Ceratina cucurbitina (Rossi, 1792)

Records: France, Fontan/400m 1♀, La Brigue/800m 5♀,
Mollières valley/1100m 2♀, Saorge/700m 2♀,
Tende/900m 3♀, Italy, Brignola/720m 1♀, St
Lorenzo/1000m 1♂, Tetti Grella/980m 1m, Valle Maira/
Macra/900m 1♂ 1♀.
Distribution: European.

Ceratina cyanea (Kirby, 1802)

Records: France, La Brigue/800m 1♀, Mollières
valley/1100m 1♂ 1♀, Saorge/700m 2♂ 3♀, Italy,
Entraque/900m 2♂ 1♀, Lago Rovine/A/1700m 1♂ 3♀,
Valle Maira/Macra/900m 1♂ 1♀.
Distribution: European.

Ceratina dentiventris Gerstaecker, 1869

Records: France, Fontan/400m 1♀, France, Saorge/700m
4♂ 2♀, Italy, Valle Maira/Macra/900m 1♀.
Distribution: Mediterranean.

Ceratina gravidula Gerstaecker, 1869

Records: France, Fontan/400m 1♀.
Distribution: Mediterranean.

Ceratina mocsaryi Friese, 1896

Records: France, La Bollène/630m 1♀, Mollières
valley/1100m 1♀.
Distribution: Mediterranean.

Chelostoma campanularum (Kirby, 1802)

Records: France, La Brigue/800m 1♂ 1♀, Millefontes/
C/2030m 2♂, Tende/900m 1♀, Italy, Lago Rovine/
B/1700m 2♂, Valle Maira/Macra/900m 1♂.
Distribution: European.

Chelostoma distinctum (E. Stoeckert, 1929)

Records: France, Mollières valley/1100m 2♀, Fran-
ce, Tende/900m 1♀, Italy, Brignola/700m 5♀,
Entraque/900m 1♂ 2♀.
Distribution: European.

Chelostoma florisomne (Linnaeus, 1758)

Records: France, Le Pra/1700m 1♀, Millefontes/B/2030m
1♀, Millefontes/C/2030m 1♂.
Distribution: European.

Chelostoma grande (Nylander, 1852)

Records: France, Col de Cayolle/1860m 3♂, Isola/1600m
1m 5♀, Mollières valley/1100m 2♀, Mollières/1600m
3♀.
Distribution: Alpine, restricted to lower altitudes.

Chelostoma rapunculi (Lepeletier, 1841)

Records: France, La Brigue/800m, La Brigue/800m 1♂,
Mollières valley/1100m 3m 1♀, Italy, Entraque/900m
1♂, St Lorenzo/1000m 3♂ 1♀, Valle Maira/
Stroppo/1300m 1♂.
Distribution: European.

Coelioxys afra Lepeletier, 1841

Records: France, Saorge/700m 1♂, France, Tende/900m
2♂ 2♀, Italy, Valle Maira/Macra/900m 3♀.
Distribution: European.

Coelioxys argentea Lepeletier, 1841

Records: France, Saorge/700m 15♂ 1♀.
Distribution: Mediterranean.



Fig. 17: The bee *Coelioxys argentea* (♂) is the parasit of *Megachile albisecta* and was common in Saorge.

Coelioxys aurolimbata Förster, 1853

Records: France, La Bollène/630m 1♂, Italy, Lago
Rovine/B/1700m 1♂.
Distribution: European.

Coelioxys echinata Förster, 1853

Records: France, Saorge/700m 1♂ 2♀.

Distribution: European.

Coelioxys inermis (Kirby, 1802)

Records: France, La Foux-d'Allos/1900m 1♂.

Distribution: European.

Colletes daviesanus Smith, 1846

Records: France, Mollières/1600m 1♂.

Distribution: European.

Colletes floralis Eversmann, 1852

Records: France, Col de Cayolle/2350m 3♂, Isola/1600m 2♂ 1♀.

Distribution: Montane.

Colletes fodiens (Geoffrey, 1785)

Records: France, Tende/900m 2♂.

Distribution: European.

Colletes impunctatus Nylander, 1852

Records: France, Col de Cayolle/2350m 1♂, Col de Cayolle/2350m 12♂ 9♀, Valmasque/2200m 1♂.

Distribution: Montane.

Colletes nigricans Gistel, 1857

Records: France, Saorge/700m 5♂, Tende/900m 1♀.

Distribution: Submediterranean.

Colletes similis Schenck, 1853

Records: Italy, Tetti Grella/980m 1♀.

Distribution: European.

Dioxys cincta (Jurine, 1807)

Records: France, Col de Tende/C/1830m 1♀.

Distribution: Submediterranean.

Dioxys tridentata (Nylander, 1848)

Records: France, La Brigue/800m 1♂, Le Pra/1700m 1♀, Mollières/1600m 1♀, Tende/900m 2♂.

Distribution: European.

Dufourea alpina Morawitz, 1865

Distribution: Alpine.

Dufourea dentiventris (Nylander, 1848)

Records: France, Col de Cayolle/2350m 1♂, Italy, Lago Rovine/B/1700m 1♀.

Distribution: Montane.

Dufourea paradoxa Morawitz, 1867

Records: Italy, Lago Rovine/B/1700m 1♂ 1♀, Italy, Lago

Rovine/B/1700m 2m♂

Distribution: Alpine.

Epeolus alpinus Bischoff, 1930

Records: France, Valmasque/2200m 2♂.

Distribution: Alpine.

Eucera longicornis (Linnaeus, 1758)

Records: France, La Foux-d'Allos/1900m 1♀, Italy, Lago Rovine/A/1700m 2♂.

Distribution: European.

Halictus confusus Smith, 1853

Records: France, St.Sauveur/700m 1♀.

Distribution: European.

Halictus gavarnicus Pérez, 1903

Records: France, Col de Cayolle/2350m 1♀.

Distribution: Submediterranean.

Halictus langobardicus Blüthgen, 1944

Records: France, La Brigue/800m 1♂.

Distribution: European.

Halictus maculatus Smith, 1848

Records: France, La Bollène/630m 1♀, La Bollène/630m 1♂, Saorge/700m 1♀, Tende/900m 1♂.

Distribution: European.

Halictus patellatus Morawitz 1873

Records: France, Saorge/700m 1♂.

Distribution: Submediterranean.

Halictus quadricinctus (Fabricius, 1776)

Records: France, Fontan/400m 1♀, Mollières valley /1100m 5♂ 1♀, Saorge/700m 5m 3♀, Italy, Brignola/720m 2♀, St Lorenzo/1000m 1♂, St Lorenzo/1000m 1♂ 2♀.

Distribution: European.

Halictus rubicundus (Christ, 1791)

Records: Italy, Lago Rovine/A/1700m 1♀, Lago Rovine/B/1700m 2♂ 1♀, St Lorenzo/1000m 2♀.

Distribution: European.

Halictus scabiosae (Rossi, 1790)

Records: France, Col de Tende/B/1400m 1♀, Millefontes/B/2030m 4♀, Saorge/700m 1♂ 2♀, Tende/900m 1♀.

Distribution: European.

Halictus sexcinctus (Fabricius, 1775)

Records: Italy, St Lorenzo/1000m 3♀.

Distribution: European.

Halictus smaragdulus Vachal, 1895

Records: France, Saorge/700m 1♀, Italy, Valle Maira/Macra/900m 2♀.

Distribution: Submediterranean, northwards to Germany.

Halictus subauratus (Rossi, 1792)

Records: France, Fontan/400m 1♂ 1♀, La Brigue/800m 1♀, Mollières valley/1100m 5♀, Saorge/700m 2♂ 3♀, St.Sauveur/700m 1♀, Tende/900m 2♂ 5♀.

Distribution: European.

Halictus tumulorum (Linnaeus, 1758)

Records: France, La Foux-d'Allos/1900m 1♀, Le Pra/1700m 3♀, Mollières valley/1100m 2♀, Mollières/1600m 1♀, Italy, Lago Rovine/A/1700m 3♀, Tetti Grella/980m 3♀.

Distribution: European.

Halictus spec.

Remark: The collection of the Oberösterreichisches Landesmuseum Linz/Austria includes some males of an undescribed *Halictus* species from lower parts of Mercantour. The taxon belongs to the *Halictus simplex*-species group and will be described soon by P. Andreas Ebmer (Ebmer, pers. comm.). I could collect some females, which may belong to this species, but identification is not possible without males.

Heriades crenulatus Nylander, 1856

Records: France, La Bollène/630m 2♂, Saorge/700m 6♂ 4♀, Tende/900m 1♂.

Distribution: European.

Heriades truncorum (Linnaeus, 1758)

Records: France, La Bollène/630m 1♀, France, Mollières valley/1100m 2♂ 3♀, Mollières/1600m 5♀, Saorge/700m 3♂ 1♀, Italy, Lago Rovine/B/1700m 2♂ 1♀.

Distribution: European.

Hylaeus alpinus (Morawitz, 1867)

Records: France, Col de Cayolle/2350m 1♂, Col de Tende/C/1830m 2♂, L'Authion/2000m 1♂ 1♀, Le Pra/1700m 1♂ 1♀, Millefontes/C/2030m 3m, Valmasque/2200m 9♂ 2♀, Italy, Lago Rovine/B/1700m 4♂ 1♀.

Distribution: Alpine.

Hylaeus angustatus (Schenck, 1861)

Records: France, La Brigue/800m 1♂, Le Pra/1700m 1♀, Millefontes/C/2030m 2♂, Tende/900m 1♂, Italy, Lago Rovine/B/1700m 2♂ 2♀.

Distribution: European.

Hylaeus annulatus (Linnaeus, 1758)

Records: France, Millefontes/C/2030m 3♂ 1♀, France, Valmasque/2200m 1♂, Italy, Lago Rovine/B/1700m 2♀.

Distribution: Montane.

Hylaeus brachycephalus (Morawitz, 1868)

Records: France, Isola/1600m 1♂ 2♀.

Distribution: SW-Mediterranean.

Hylaeus brevicornis Nylander, 1852

Records: France, La Brigue/800m 1♂, Saorge/700m 2♂.

Distribution: European.

Hylaeus clypearis Schenck, 1853

Records: France, La Brigue/800m 3♂ 6♀, Mollières/1600m 1♂ 2♀, Saorge/700m 1♂ 2♀, Tende/900m 1♂ 1♀.

Distribution: European.

Hylaeus communis Nylander, 1852

Records: France, Fontan/400m 1♀, La Brigue/800m 1♀, Le Pra/1700m 1♂ 2♀, Mollières valley/1100m 1♂ 4♀, Mollières/1600m 4♂ 2♀, Saorge/700m 1♂ 4♀, Tende/900m 2♀, Italy, St Lorenzo/1000m 1♂ 1♀, Valle Maira/Stroppio/1300m 1♂.

Distribution: European.

Hylaeus confusus Nylander, 1852, aggr.

Records: France, Isola/1600m 3♀, Le Pra/1700m 1♀, Mollières valley/1100m 1♂ 1♀, Saorge/700m 3♂ 5♀, St.Sauveur/700m 1♀, Tende/900m 2♀, St Lorenzo/1000m 1♂ 1♀.

Distribution: European.

Remark: The specimens were not checked for *Hylaeus gibbus* Saunders, 1850.

Hylaeus cornutus Curtis, 1831

Records: France, Tende/900m 1♂.

Distribution: European.

Hylaeus difformis (Eversmann, 1852)

Records: France, Mollières valley/1100m 2♂ 1♀, Saorge/700m 1♀.

Distribution: European.

Hylaeus dilatatus Kirby, 1802

(*Hylaeus annularis* in Amiet et al. 1999)

Records: France, La Foux-d'Allos/1900m 2♂, Col de Cayolle/2300m 2♂, Le Pra/1700m 1♂, 1♀, Millefontes/C/2030m 2♂ 1♀, Italy, Lago Rovine/A/1700m 1♂ 1♀, Tetti Grella/980m 1♂.

Distribution: European.

Hylaeus glacialis Morawitz, 1872

Records: France, Col de Cayolle/2300m 2♂, Le Pra 1700m 1♂, Millefontes/C/2030m 2♂1♀. Italy: Lago Rovine/A/1700m 1♂.

Distribution: Alpine.



Fig. 18: The bee *Hylaeus glacialis* (♂) is a typical member of the alpine fauna.

Hylaeus grederi Förster, 1871

Records: France, La Brigue/800m 1♀, France, Tende/900m 1♂, Italy, Tetti Grella/980m 1♂,

Distribution: European.

Hylaeus hyalinatus Smith, 1842

Records: France, La Brigue/800m 1♂ 2♀, France, Le Pra/1700m 5♂ 4♀, Mollières valley/1100m 1♀, Mollières/1600m 2♂, Saorge/700m 5♂ 2♀, Tende/900m 1♀, Italy, Lago Rovine/A/1700m 1♀, Lago Rovine/B/1700m 5m 3♀, Valle Maira/Macra/900m 2♂, Valle Maira/Stroppo/1300m 1♂ 1♀.

Distribution: European.

Hylaeus intermedius Förster, 1871

Records: France, La Brigue/800m 1♂ 3♀, Saorge/700m 1♂.

Distribution: Submediterranean.

Hylaeus kahri Förster, 1871

Records: France, Casterino/1700m 1♂, La Brigue/800m 1♂, Mollières valley/1100m 1m, Mollières/1600m 7♂ 4♀, Saorge/700m 1m, Tende/900m 2♂, Italy, Brignola/720m 1♂ 1♀, Lago Rovine/B/1700m 1♂, Valle Maira/Stroppo/1300m 2♂.

Distribution: Submediterranean, northwards to Germany.

Hylaeus lineolatus (Schenck, 1861)

Records: France, Saorge/700m 1♂ 1♀.

Distribution: European.

Hylaeus nigrinus (Fabricius, 1798)

Records: France, La Foux-d'Allos/1900m 1♂ 1♀, Italy, Lago Rovine/B/1700m 8m 3♀, Valle Maira/Macra/900m 1♂.

Distribution: European.

Hylaeus nivalis (Morawitz, 1867)

Records: France, Col de Cayolle/2180m 3♂, Col de Cayolle/2300m 3♂, Col de Cayolle/2350m 3♂, Le Pra/1700m 1♂, Millefontes/B/2030m 1♂, Millefontes/C/2030m 2♂ 2♀, Valmasque/2200m 1♂.

Distribution: Alpine.

Hylaeus pictus (Smith, 1853)

Records: France, Saorge/700m 1♀.

Distribution: Mediterranean.

Hylaeus punctatus (Brullé, 1832)

Records: France, La Brigue/800m 1♂ 1♀, Saorge/700m 2♂ 3♀.

Distribution: European.

Hylaeus punctulatus Smith, 1842

Records: France, La Brigue/800m 1♂.

Distribution: European.

Hylaeus signatus (Panzer, 1798)

Records: Italy, Entraque/900m 1♂, Valle Maira/Macra/900m 1♂.

Distribution: European.

Hylaeus sinuatus (Schenck, 1873)

Records: France, Fontan/400m 1♀, Tende/900m 1♀.

Distribution: European.

Hylaeus styriacus Förster, 1871

Records: France, Saorge/700m 1♂, Italy, Brignola/720m 1m, Valle Maira/Macra/900m 1♂.

Distribution: European.

Hylaeus variegatus (Fabricius, 1798)

Records: France, La Bollène/630m 1♂ 1♀, La Brigue/800m 1♂, Saorge/700m 3♂, Tende/900m 7♂ 6♀.

Distribution: European.

Lasioglossum aeratum (Kirby, 1802)

Records: France, Casterino/1700m 2♀, Col de Cayolle/2180m 1♀, Col de Cayolle/2350m 2♀, Col de Tende/C/1830m 1♀, La Brigue/800m 1♂, L'Authion/2000m 1♀, Millefontes/C/2030m 5♀, Italy, Brignola/720m 3♂, St Lorenzo/1000m 1♀, Tetti Grella/980m 2♀.

Distribution: European.

Lasioglossum albipes (Fabricius, 1781)

Records: France, Col de Cayolle/2300m 1♀, Col de Cayolle/2350m 6♀, Col de Tende/B/1400m 3♀, Col de Tende/C/1830m 2♀, L'Authion/2000m 3♀, Millefontes/B/2030m 4♀, Valmasque/2200m 1♀, Italy, Lago Rovine/A/1700m 4♀, Lago Rovine/B/1700m 3♀, St Lorenzo/1000m 1♀, Valle Maira/Stroppo/1300m 1♀.
Distribution: European.

Lasioglossum angusticeps (Perkins, 1895)

Records: France, La Bollène/630m 1♀.
Distribution: European.

Lasioglossum bavaricum (Blüthgen, 1930)

Records: France, Le Pra/1700m 1♀, France, Mollières/1600m 1♀.
Distribution: Alpine.

Lasioglossum breviventre (Schenck, 1853)

Records: France, Millefontes/C/2030m 1♀.
Distribution: Montane.

Lasioglossum buccale (Pérez, 1903)

Records: Italy, Entraque/900m 1♀.
Distribution: European.

Lasioglossum calceatum (Scopoli, 1763)

Records: France, La Bollène/630m 1♀, Italy, Lago Rovine/A/1700m 1♀, Lago Rovine/B/1700m 1♀, St Lorenzo/1000m 1♀.
Distribution: European.

Lasioglossum convexiusculum (Schenck, 1853)

Not collected in the Park.
Records: Italy, Valle Maira/Stroppo/1300m 1♀.
Distribution: European.

Lasioglossum cupromicans (Pérez, 1903)

Records: France, Col de Cayolle/2180m 1♀, Col de Cayolle/2300m 4♀, Col de Cayolle/2350m 2♀, Col de Tende/C/1830m 1♀, Fontan/400m 1♀, Millefontes/C/2030m 1♀, Valmasque/2200m 1♀, Italy, Lago Rovine/A/1700m 2♀.
Distribution: Montane.

Lasioglossum fulvicorne (Kirby, 1802)

Records: France, Casterino/1700m 1♀, Col de Cayolle/1860m 1♂, Col de Tende/B/1400m 1♀, Col de Tende/C/1830m 2♀, Fontan/400m 1♀, Isola/1600m 1♀, La Bollène/630m 2♀, L'Authion/2000m 1♀, Le Pra/1700m 1♀, Millefontes/B/2030m 1♀, Millefontes/C/2030m 7♀, Mollières valley/1100m 1♀, Italy, Lago Rovine/A/1700m 5♀.
Distribution: European.

Lasioglossum griseolum (Morawitz, 1872)

Records: France, La Bollène/630m 1♀, La Brigue/800m 1♀.
Distribution: European.

Lasioglossum interruptum (Panzer, 1798)

Records: France, La Bollène/630m 2♀, La Bollène/630m 5♀, Saorge/700m 4♀, Tende/900m 1♀, Italy, Valle Maira/Stroppo/1300m 1♀.
Distribution: European.

Lasioglossum laticeps (Schenck, 1870)

Records: France, Col de Tende/C/1830m 2♀, Isola/1600m 5♀, Italy, Lago Rovine/B/1700m 2♀.
Distribution: European.

Lasioglossum leucopus (Kirby, 1802)

Records: France, Casterino/1700m 1♀, Col de Cayolle/2180m 1♀, Col de Cayolle/2350m 1♀, La Foux-d'Allos/1900m 1♀, Millefontes/C/2030m 1♀, Italy, Tetti Grella/980m 1♀.
Distribution: European.

Lasioglossum leucozonium (Schrank, 1781)

Records: France, Col de Tende/B/1400m 1♀, Saorge/700m 2♀, Italy, St Lorenzo/1000m 1♀.
Distribution: European.

Lasioglossum lissonotum (Noskiewicz, 1926)

Records: France, La Brigue/800m 1♂.
Distribution: European.

Lasioglossum malachurum (Kirby, 1802)

Records: France, La Bollène/630m 1♀.
Distribution: European.

Lasioglossum mediterraneum (Blüthgen, 1926)

Records: France, Fontan/400m 1♀, La Bollène/630m 1♀.
Distribution: Mediterranean.

Lasioglossum morio (Fabricius, 1793)

Records: France, Col de Tende/B/1400m 1♂, Fontan/400m 1♀, Isola village/900m 2♀, La Foux-d'Allos/1900m 1♂, Le Pra/1700m 4♀, Le Pra/1700m 1♂, Mollières valley/1100m 1♀, Mollières valley/1100m 11♀, St.Sauveur/700m 2♀, Italy, Lago Rovine/A/1700m 1♀, Lago Rovine/B/1700m 1♀, St Lorenzo/1000m 4♀, Valle Maira/Macra/900m 3♀.
Distribution: European.

Lasioglossum nigripes (Lepeletier, 1841)

Records: France, Millefontes/B/2030m 1♀, Saorge/700m 2♀.
Distribution: European.

Lasioglossum nitidulum (Fabricius, 1804)

Records: France, Col de Cayolle/2350m 1♀, Col de Cayolle/2350m 2♀, Col de Tende/B/1400m 1♀, Col de Tende/C/1830m 4m 4♀, Isola/1600m 4♀, La Brigue/800m 2♀, La Foux-d'Allos/1900m 1♀, Le Pra/1700m 2♀, Millefontes/B/2030m 1♀, Millefontes/C/2030m 6♀, Mollières valley/1100m 3♀, Saorge/700m 2♀, St.Sauveur/700m 3♀, Tende/900m 1♂ 2♀, Valmasque/2200m 1♀, Italy, Brignola/700m 1♂ 3♀, St Lorenzo/1000m 2♀, Valle Maira/Stroppo/1300m 2♂ 1♀.
Distribution: European.

Lasioglossum parvulum (Schenck, 1853)

Records: France, Col de Tende/C/1830m 1♀, Italy, Lago Rovine/A/1700m 1♀.
Distribution: European.

Lasioglossum pauxillum (Schenck, 1853)

Records: France, Fontan/400m 1♀, Tende/900m 1♀.
Distribution: European.

Lasioglossum podolicum (Noskiewicz, 1925)

Records: France, Mollières valley/1100m 1♀, Tende/900m 1♀.
Distribution: Submediterranean.

Lasioglossum politum (Schenck, 1853)

Records: France, Casterino/1700m 1♀, La Bollène/630m 4♀, La Brigue/800m 13♀, Saorge/700m 8♀.
Distribution: European.

Lasioglossum punctatissimum (Schenck, 1853)

Records: France, Saorge/700m 1♀, Italy, Valle Maira/Macra/900m 1♀.
Distribution: European.

Lasioglossum rufitarse (Zetterstedt, 1838)

Records: France, Casterino/1700m 1♀.
Distribution: European.

Lasioglossum subhirtum (Lepeletier, 1841)

Records: France, Tende/900m 3♀.
Distribution: European.

Lasioglossum transitorium (Schenck, 1868)

Not collected in the Park.
Records: Italy, Valle Maira/Macra/900m 1♀.
Distribution: Submediterranean.

Lasioglossum tricinctum (Schenck, 1874)

Records: France, La Bollène/630m 2♀, Tende/900m 1♀.
Distribution: European.

Lasioglossum villosulum (Kirby, 1802)

Records: France, La Bollène/630m 1♀, Saorge/700m 2♀.
Distribution: European.

Lasioglossum xanthopum (Kirby, 1802)

Records: France, Tende/900m 1♀.
Distribution: European.

Lithurgus chrysurus Fonscolombe, 1834

Records: France, Fontan/400m 1♂, Isola village/900m 4♂ 9♀, La Bollène/630m 1m, Italy, St Lorenzo/1000m 1♂.
Distribution: Submediterranean.

Megachile albisecta (Klug, 1817)

Records: France, La Brigue/800m 1♂, Saorge/700m 9♂ 2♀.
Distribution: Mediterranean.

Megachile analis Nylander, 1852

Records: France, La Foux-d'Allos/1900m 2♂, Italy, Lago Rovine/B/1700m 1♂.
Distribution: Montane.

Megachile apicalis Nylander, 1848

Records: France, Fontan/400m 1♀.
Distribution: Submediterranean, northwards to southern Germany.

Megachile circumcincta Kirby, 1802

Records: France, Millefontes/C/2030m 1♀.
Distribution: European.

Megachile deceptoris Pérez, 1890

Records: France, Col de Cayolle/1860m 2♀.
Distribution: Mediterranean.

Megachile ericetorum Lepeletier, 1841

Records: France, Tende/900m 2♂.
Distribution: European.

Megachile flabellipes Pérez, 1895

Records: France, Fontan/400m 1♂.
Distribution: Submediterranean.

Megachile lagopoda (Linnaeus, 1761)

Records: France, Isola/2000m 1♀, Saorge/700m 1♀, Tende/900m 1♂ 2♀, Italy, St Lorenzo/1000m 1♂ 4♀, St Lorenzo/1000m 2♂, Valle Maira/Macra/900m 2♂.
Distribution: European.

Megachile maritima (Kirby, 1802)

Records: France, La Bollène/630m 1♂.
Distribution: European.

Megachile opacifrons Perez, 1897

Records: France, Saorge/700m 1♂.

Distribution: Mediterranean.



Fig. 19: *Megachile opacifrons* (♂) is a rare mediterranean species.

Megachile parietina (Geoffroy, 1785)

Records: Italy, St Lorenzo/1000m 1♀.

Distribution: Submediterranean, northwards to southern Germany.

Megachile pilidens Alfken, 1924

Records: France, Tende/900m 1♂, Italy, Valle Maira/Macra/900m 1♂ 1♀.

Distribution: European.

Megachile pyrenaica Pérez, 1890

Records: France, Col de Tende/C/1830m 1♂ 1♀, Isola/1600m 1♀, Le Pra/1700m 2♂ 1♀, Millefontes/C/2030m 1♂, Valmasque/2200m 1♀, Italy, Lago Rovine/B/1700m 4♂, St Lorenzo/1000m 1♂.

Distribution: Montane.



Fig. 20: A female of the bee *Megachile pyrenaica* is taking mud for its nest. The species was common in the park.

Megachile pyrenaica Lepeletier, 1841

Records: France, Casterino/1700m 7♀, Col de Cayolle/2350m 3♀, Isola/1600m 1♀, La Brigue/800m 1♀, La Foux-d'Allos/1900m 1♀, Le Pra/1700m 1♀, Italy, Lago Rovine/A/1700m 9♂ 3♀, Lago Rovine/B/1700m 5♀,

St Lorenzo/1000m 1♀.

Distribution: Montane.

Megachile rotundata (Fabricius, 1787)

Records: France, Fontan/400m 1♂, La Brigue/800m 2♂, Saorge/700m 6♂, Tende/900m 2♂.

Distribution: European.

Megachile rufescens (Lichtenstein, 1876)

Records: France, La Brigue/800m 2♀.

Distribution: Mediterranean.

Remark: The species is similar to *Megachile pyrenaica* and can be recognized e.g. by black tibiae in females (red in *pyrenaica*).*Megachile versicolor* Smith, 1844

Records: Italy, Lago Rovine/B/1700m 1♂.

Distribution: European.

Megachile willughbiella (Kirby, 1802)

Records: France, Isola/1600m 1m, La Foux-d'Allos/1900m 1♂, Le Pra/1700m 1♂, Millefontes/C/2030m 2♀, Mollières valley/1100m 1♂, Mollières/1600m 1♂.

Distribution: European.

Melecta luctuosa (Scopoli, 1770)

Records: France, Col de Tende/C/1830m 1♀.

Distribution: European.

Nomada armata Herrich-Schaeffer, 1839

Records: Italy, Entraque/900m 1♀, Valle Maira/Stroppo/1300m 1♂.

Distribution: European.

Nomada fabriciana (Linnaeus, 1767)

Records: France, La Foux-d'Allos/1900m 1♂, Italy, Lago Rovine/B/1700m 1♀, St Lorenzo/1000m 1♀.

Distribution: European.

Nomada flavoguttata (Kirby, 1802)

Records: France, La Foux-d'Allos/1900m 1♀, Valmasque/2200m 2♂ 1♀.

Distribution: European.

Nomada guttulata Schenck, 1861

Records: Italy, Lago Rovine/B/1700m 1♀.

Distribution: European.

Nomada lathburiana (Kirby, 1802)

Records: France, Col de Tende/C/1830m 1♀.

Distribution: European.

Nomada marshamella (Kirby, 1802)

Records: Italy, Lago Rovine/A/1700m 1♂.

Distribution: European.

Nomada panzeri Lepeletier, 1841

Records: France, Valmasque/2200m 1♀.

Distribution: European.

Nomada roberjeotiana Panzer, 1799

Records: France, Millefontes/C/2030m 1♀.

Distribution: European.

Nomada sexfasciata Panzer, 1799

Records: Italy, Tetti Grella/980m 1♀.

Distribution: European.

Nomada similis Morawitz, 1872

Records: France, Col de Cayolle/2350m 2♂ 2♀, Col de Tende/C/1830m 1m, Millefontes/C/2030m 1♂ 1♀.

Distribution: European.

Nomada striata Fabricius, 1793

Records: Italy, Lago Rovine/A/1700m 1♂.

Distribution: European.

Osmia acuticornis Dufour & Perris, 1840

Records: France, Mollières valley/1100m 1♀. Italy, Tetti Grella/980m 1♀.

Distribution: European.

Osmia adunca (Panzer, 1798)

Records: France, Col de Cayolle/1860m♂, Isola/1600m 1♀, La Brigue/800m 2♂, La Foux-d'Allos/1900m 5♂ 2♀, Mollières valley/1100m 1♀, Mollières/1600m 1♂ 7♀, Saorge/700m 1♀, Italy, Brignola/720m 1♂, Entraque/900m 2♂, Lago Rovine/B/1700m 1♀, St Lorenzo/1000m 1♂ 1♀, Valle Maira/Macra/900m 4♂.

Distribution: European.

Osmia andrenoides Spinola, 1808

Records: France, Fontan/400m 1♀, La Bollène/630m 1♂ 1♀, La Brigue/800m 1♂ 1♀, Saorge/700m 2♂ 2♀.

Distribution: European.

Osmia anthocopoides Schenck, 1853

Records: France, La Foux-d'Allos/1900m 1♂, France, Millefontes/C/2030m 1♀, Italy, St Lorenzo/1000m 3♀, St Lorenzo/1000m 1♂ 1♀, Tetti Grella/980m 1♂.

Distribution: European.

Osmia aurlenta Panzer, 1799

Records: France, Col de Tende/B/1400m 1♀, La Bollène/630m 3♀, La Brigue/800m 1♀, Tende/900m 3♀, Italy,

Entraque/900m 1♀.

Distribution: European.

Osmia brachypogon Pérez, 1879

Records: France, La Bollène/630m 1♂.

Distribution: Mediterranean, northwards to Valle d'Aosta (Italy, Amiet 2004).

Osmia caerulea (Linnaeus, 1758)

Records: France, Isola/1600m 1♀, Tende/900m 1♀, Italy, Valle Maira/Macra/900m 1♀.

Distribution: European.

Osmia claviventris Thomson, 1872

Records: France, Millefontes/C/2030m 1♀, Mollières valley/1100m 1♂, Mollières/1600m 1♀, Italy, Lago Rovine/A/1700m 2♂, Lago Rovine/B/1700m 1♂ 2♀, Valle Maira/Stroppo/1300m 1♀.

Distribution: European.

Osmia dalmatica Morawitz, 1871

Not collected in the Park.

Records: Italy, Valle Maira/Stroppo/1300m 2♂.

Distribution: Montane.

Remark: The species is only known from Valle d'Aosta in Italy, Wallis in Switzerland, Croatia and Slovenia (Amiet, 2004). The present record is the most southwestern finding in the Alps. Andreas Müller (pers. communication) reports unpublished findings from the Pyrenees (France) and from Spain. The species is restricted to large and xerothermic habitats of the "Steppenheide" in lower parts of the Alps.

Osmia emarginata Lepeletier, 1841

Records: France, Millefontes/C/2030m 1♀.

Distribution: SW-Submediterranean, northwards to Belgium. Rare species, it occurs in the Park on its eastern distribution limit.

Osmia gallarum Spinola, 1808

Records: La Brigue/800m 1♀, Le Pra/1700m 2♀, Mollières valley/1100m 3♀, Tende/900m 2♀, Italy, Lago Rovine/A/1700m 6♂ 7♀, Lago Rovine/B/1700m 4♀.

Distribution: European.

Osmia labialis Pérez, 1879

Records: Italy, Lago Rovine/A/1700m 3♂ 2♀, Lago Rovine/B/1700m 1♀.

Distribution: European.

Osmia leaiana (Kirby, 1802)

Not collected in the Park.

Records: Italy, Valle Maira/Stroppo/1300m 1♀.

Distribution: European.

Osmia lepeletieri Pérez, 1879

Records: France, Col de Cayolle/1860m 1♀, La Foux-d'Allos/1900m 3♂ 2♀, Mollières valley/1100m 1♂ 1♀, Italy, Lago Rovine/A/1700m 1♂, Lago Rovine/B/1700m 1♂.

Distribution: Montane.

Osmia leucomelana (Kirby, 1802)

Records: France, Col de Cayolle/1860m 1♀, Isola village/900m 1♀, La Brigue/800m 1♂ 1♀, La Foux-d'Allos/1900m 1♀, Le Pra/1700m 1♂ 1♀, Mollières valley/1100m 3♀, Mollières/1600m 2♀, Saorge/700m 1♂ 1♀, St.Sauveur/700m 1♂ 1♀, Italy, Entraque/900m 2♂, Lago Rovine/B/1700m 14♂ 5♀, Tetti Grella/980m 1♀, Valle Maira/Stroppo/1300m 1♂ 1♀.

Distribution: European.

Osmia ligurica Morawitz, 1868

Records: France, La Bollène/630m 1♀,

Distribution: Mediterranean.

Osmia loti Morawitz, 1867

Records: France, Col de Cayolle/2180m 1♂, Col de Cayolle/2350m 2♂, La Foux-d'Allos/1900m 1♂, Millefontes/B/2030m 3♂, Millefontes/C/2030m 6♂ 1♀, Italy, Lago Rovine/A/1700m 4♂ 1♀, Lago Rovine/B/1700m 4♂ 7♀.

Distribution: European.

Osmia minutula Pérez, 1896

Records: France, Casterino/1700m 1♂, Col de Tende/B/1400m 1♀, La Brigue/800m 1♂, Tende/900m 2♂, Italy, Valle Maira/Stroppo/1300m 1♀

Distribution: Submediterranean.

Osmia mitis Nylander, 1852

Records: France, Isola/1600m 1♀, Millefontes/C/2030m 5♂, Mont Giraud/2500m 1♂, Italy, Entraque/900m 1♂.

Distribution: European.

Osmia mustelina Gerstaecker, 1869

Records: Italy, Lago Rovine/A/1700m 1♀, Lago Rovine/B/1700m 1♀, St Lorenzo/1000m 1♀.

Distribution: European.

Osmia nasuta Friese, 1899

Records: France, Col de Cayolle/2350m 1♂.

Distribution: Mediterranean.

Osmia nigriventris (Zetterstedt, 1838)

Records: France, Millefontes/C/2030m 1♀.

Distribution: European.

Osmia niveata (Fabricius, 1804)

Not collected in the Park.

Records: Italy, Valle Maira/Macra/900m 1♀.

Distribution: European.

Osmia papaveris (Latreille, 1799)

Records: France, La Foux-d'Allos/1900m 1♂ 3♀, Italy, Valle Maira/Macra/900m 1♂.

Distribution: European.

Osmia ravouxi Pérez, 1902

Records: France, Col de Cayolle/2350m 6m, Millefontes/C/2030m 1♂ 2♀.

Distribution: European.

Osmia rufohirta Latreille, 1811

Records: France, Tende/900m 1♀, Italy, St Lorenzo/1000m 1♀, Valle Maira/Macra/900m 1♀.

Distribution: European.

Osmia spinulosa (Kirby, 1802)

Records: France, La Brigue/800m 1♀, Italy, Entraque/900m 2♂.

Distribution: European.

Osmia tergestensis Ducke, 1897

Records: France, Col de Tende/B/1400m 1♀, Italy, Entraque/900m 2♀, St Lorenzo/1000m 1♀, Valle Maira/Macra/900m 1♀.

Distribution: Submediterranean.

Osmia tridentata Dufour & Perris, 1840

Records: Italy, Tetti Grella/980m 1♀.

Distribution: European.

Osmia versicolor Latreille, 1811

Records: France, Col de Cayolle/2350m 2♀, France, Millefontes/C/2030m 1♀.

Distribution: Submediterranean.

Osmia villosa (Schenck, 1853)

Records: Italy, Lago Rovine/B/1700m 1♂.

Distribution: Montane.

Osmia viridana Morawitz, 1874

Records: France, La Foux-d'Allos/1900m 1♀.

Distribution: Submediterranean.

Osmia xanthomelana (Kirby, 1802)

Records: France, Col de Cayolle/2350m 1, Col de Tende/C/1830m 2♀, L'Authion/2000m 1♀.

Distribution: Montane.

Panurginus montanus Giraud, 1861

Records: France, Le Pra/1700m 1♂ 1♀, Mont Giraud/2500m 4♀, Col de Cayolle/2180m 1♂, Col de Cayolle/2300m 4♂ 1♀, Col de Cayolle/2350m ♂2♀, Millefontes/C/2030m 2♂, Valmasque/2200m 4♂ 1♀, Italy, Lago Rovine/B/1700m 4♀.

Distribution: Alpine.

Remark: Warncke (1972) divided *Panurginus montanus* into some subspecies. The populations from the south-western Alps belong to the ssp. *alpinus* Warncke 1972, described from Lautaret, Lac d'Allos and Col du Galibier. This species group needs revision and some subspecies of Warncke most probably represent valid species.

Panurgus calcaratus (Scopoli, 1763)

Records: Italy, Brignola/700m 3♀.

Distribution: European.

Panurgus banksianus (Kirby, 1802)

Records: France, Col de Cayolle/1860m 1♀, Col de Cayolle/2300m 1♂, Col de Cayolle/2350m 1♂ 1♀, Col de Tende/C/1830m 1♀, Isola/2000m 1♂, L'Authion/2000m 2♂, Le Pra/1700m 9♂ 4♀, Millefontes/B/2030m 4♂ 2♀, Millefontes/C/2030m 4♂, Mont Giraud/2500m 1♂, Italy, Lago Rovine/A/1700m 1♂, Lago Rovine/B/1700m 1♀, Brignola/700m 1♀.

Distribution: European.

Panurgus dentipes Latreille, 1811

Records: France, Col de Cayolle/1860m 2♂, Col de Cayolle/2180m 2♂, Col de Tende/B/1400m 2♂, Col de Tende/C/1830m 3♂, Fontan/400m 1♀, Isola/1600m 8m 8♀, L'Authion/2000m 3♂, Le Pra/1700m 4♀, Le Pra/1700m 2♂ 1♀, Millefontes/B/2030m 6♂ 1, Millefontes/C/2030m 1♂ 1♀, Saorge/700m 2♀.

Distribution: SW-Submediterranean, reaches SW-Germany.

Remark: The species does not cross the Alps versus north or east. It is common in the western valleys of the French Alps (e.g. Durance Valley, my observation) and in western Suisse, but absent e.g. in the Valle d'Aosta in Italy. It was also not found in Italy in the present examination, but occurs on Col de Tende near the border to Italy.

Rophites algirus Pérez, 1895

Records: France, La Foux-d'Allos/1900m 4♂, Italy, Entraque/900m 3♂, St Lorenzo/1000m 1♀, Tetti Grella/980m 4♂.

Distribution: European.

Sphecodes crassanus Warncke, 1992

Records: France, La Bollène/630m 1♀.

Distribution: SW-Mediterranean.

Sphecodes crassus Thomson, 1870

Records: France, La Bollène/630m 1♀. La Foux-d'Allos/1900m 1♀.

Distribution: European.

Sphecodes ephippius (Linnaeus, 1767)

Records: France, Fontan/400m 1♂, Tende/900m 3♂ 1♀.

Distribution: European.

Sphecodes ferruginatus von Hagens, 1882

Records: France, Col de Cayolle/2350m 1♀.

Distribution: European.

Sphecodes geoffrellus (Kirby, 1802)

Records: France, Col de Cayolle/2350m 3♀, Millefontes/C/2030m 6♀.

Distribution: European.

Sphecodes gibbus (Linnaeus, 1758)

Records: France, La Brigue/800m 1♀, Mollières valley/1100m 1♂, Mollières/1600m 1♂, Tende/900m 1♂ 1♀.

Distribution: European.

Sphecodes longulus von Hagens, 1882

Records: France, Mollières/1600m 1♂.

Distribution: European.

Sphecodes monilicornis (Kirby, 1802)

Records: France, Mollières/1600m 1♀.

Distribution: European.

Sphecodes niger von Hagens, 1874

Records: France, La Brigue/800m 2♂.

Distribution: European.

Sphecodes reticulatus Thomson, 1870

Records: France, Millefontes/C/2030m 1♀.

Distribution: European.

Sphecodes rufiventris (Panzer, 1798)

Records: France, Saorge/700m 1♀.

Distribution: European.

Sphecodes zangherii Noskiewicz, 1931

Records: France, La Bollène/630m 1♀.

Distribution: European.

Stelis breviuscula Nylander, 1848

Records: France, La Brigue/800m 1♀.

Distribution: European.

Stelis nasuta (Latreille, 1809)

Records: France, La Foux-d'Allos/1900m 2♂ 1♀, Millefonts/C/2030m 1♂.

Distribution: Submediterranean.

Stelis punctulatissima (Kirby, 1802)

Records: France, Mollières valley/1100m 1♀.

Distribution: European.

Tetralonia fulvescens Giraud, 1863

Records: France, Saorge/700m 1♀, Tende/900m 1♀, Italy, Brignola/720m 3m 1♀, Valle Maira/Macra/900m 3♂.

Distribution: Submediterranean.

Thyreus histrionicus (Illiger, 1806)

Records: France, Fontan/400m 1♂ 1♀, Tende/900m 1♂.

Distribution: European.

Thyreus ramosus (Lepelletier, 1841)

Records: France, Saorge/700m 1♂ 2♀.

Distribution: Submediterranean.

Xylocopa valga Gerstaecker, 1872

Records: France, Tende/900m 1♂.

Distribution: Submediterranean.

Xylocopa violacea (Linnaeus, 1758)

Records: France, Isola/1600m 2♂ 2♀, Le Pra/1700m 1♂, Millefonts/B/2030m 1♀, Saorge/700m 1♀, Tende/900m 1♀, Italy, St Lorenzo/1000m 1♂ 1♀, Valle Maira/Stroppo/1300m 1♂.

Distribution: European.

Remark: The species was not known to occur above 1500m in the Alps before. In the present examination it was found in 2300m on flowers, and on a nesting place (old wooden house) in 1600m near Isola.

Family Chrysididae*Chrysis bicolor* Lepelletier, 1806

Records: France, Tende/900m 1♂ 3♀.

Distribution: European.

Chrysis cerastes Abeille, 1877

Records: France, La Bollène/630m 1♀.

Distribution: Mediterranean, not in North Africa.

Chrysis cortii Linsenmaier, 1951

Records: France, La Brigue/800m 5♂ 1♀.

Distribution: SW- Submediterranean, northwards to Germany.

Chrysis emarginatula Spinola, 1808

Records: France, La Foux-d'Allos/1900m 1♂ 2♀.

Distribution: SW- Mediterranean

Chrysis frivaldskyi Mocsáry, 1882

Records: Italy, Brignola/720m 1♀, Valle Maira/Macra/900m 1♂.

Distribution: SE-Mediterranean.

Chrysis germari Wesmael, 1839

Records: France, Millefonts/C/2030m 1♂, Saorge/700m 1m, St.Sauveur/700m 1♂, Tende/900m 1♂.

Distribution: European

Chrysis grohmanni Dahlbom, 1854

Records: France, Saorge/700m 1♀.

Distribution: Mediterranean.

Chrysuria hirsuta Gerstaecker, 1869

Records: France, Col de Cayolle/2180m 2♀, Millefonts/C/2030m 1♀, Valmasque/2200m 1♀.

Distribution: Montane.

Remark: The species was not mentioned for the French fauna before. Rosa (in lit.) found an unpublished record from France in the Linsenmaier collection.

Chrysis illigeri Wesmael, 1839

Records: France, Millefonts/C/2030m 1♂, Italy, Lago Rovine/B/1700m 2♂ 1♀.

Distribution: European.

Chrysis leachii Shuckard, 1836

Records: France, Fontan/400m 1♀, France, La Bollène/630m 1♂ 1♀, France, La Brigue/800m 2♀, France, Saorge/700m 1♀.

Distribution: European.

Chrysis lucida Linsenmaier, 1951

Records: France, Millefonts/C/2030m 1♀.

Distribution: Alpine.

Remark: The first record for France (Rosa in lit.).

Chrysis mixta Dahlbom, 1854

Records: France, Millefonts/C/2030m 1♀, Tende/900m 1♂.

Distribution: SW- Submediterranean.

Chrysis ruddii Shuckard, 1837

Records: France, La Foux-d'Allos/1900m 1♂ 1♀.

Distribution: European.

Chrysis rutiliventris Abeille, 1879

Records: France, Col de Cayolle/2350m 1♂, Millefonts/C/2030m 1♀.

Distribution: European.

Chrysis sculpturata Mocsáry, 1912

Records: France, Valmasque/2200m 1♀.

Distribution: Submediterranean.

Remark: Probably the first record for France (Rosa in lit.).

Chrysis scutellaris Fabricius, 1794

Records: Italy, Valle Maira/Macra/900m 1♂ 1♀.

Distribution: European.

Chrysis splendidula Rossi, 1790

Records: France, La Brigue/800m 1♀.

Distribution: Submediterranean.

Chrysis viridula Linnaeus, 1761

Records: France, La Foux-d'Allos/1900m 1♀.

Distribution: European.

Chrysura cuprea (Rossi, 1790)

Records: France, La Brigue/800m 1♀, Italy, Valle Maira/Macra/900m 2♀.

Distribution: European.

Chrysura dichroa (Dahlbom, 1854)

Records: France, Fontan/400m 1♀, France, Millefont/B/2030m 4♀, Italy, Brignola/720m 1♀, St Lorenzo/1000m 1♀, Valle Maira/Macra/900m 1♀.

Distribution: European.

Chrysura hybrida (Lepeletier, 1806)

Records: France, Millefont/B/2030m 1♀.

Distribution: SW-Submediterranean.

Chrysura laevigata (Abeille de Perrin, 1879)

Records: France, Casterino/1700m 1♀, Col de Cayolle/2180m 2♀, Col de Cayolle/2350m 1♀, La Brigue/800m 1♀, Millefont/C/2030m 1♂ 13♀.

Distribution: Submediterranean.

Remark: It is the first record for this species over 2000 m and therefore unexpected (Rosa in lit.).

Chrysura refulgens (Spinola, 1806)

Records: France, Fontan/400m 2♀, La Bollène/630m 1♀, La Brigue/800m 3♀.

Distribution: Submediterranean.

Chrysura rufiventris (Dahlbom, 1854)

Records: France, La Brigue/800m 1♀.

Distribution: Submediterranean.

Chrysura simplex ampliata Linsenmaier, 1968

Records: France, La Foux-d'Allos/1900m 1♀, Millefont/B/2030m 2♂ 1♀, Italy, Entraque/900m 1♀.

Distribution: European.

Remarks: Paolo Rosa identified the specimens as *simplex* ssp. *ampliata* Linsenmaier, 1968. Probably it is not a subspecies, but an ecological form of *simplex* living on the Alps. However it is the first record for France (Rosa in lit.).*Chrysura spec.*

Records: Millefont/C/2030m 1♀.

Remark: The specimen (*Chrysura* near *hirsuta*) is still under revision by Paolo Rosa. It may belong to an undescribed species.*Cleptes aerosus* Förster, 1853

Records: Italy, Brignola/720m 1♀.

Distribution: Submediterranean.

Hedychridium aereolum Buysson, 1893

Records: France, Col de Cayolle/2350m 3♀, Col de Tende/C/1830m 1♀, Col de Tende/C/1830m 1♀, Isola/1600m 1♀, Millefont/C/2030m 2♀, Millefont/C/2030m 5♀, Italy, Lago Rovine/B/1700m 1♀.

Distribution: Alpine.

Hedychridium chloropygum Buysson, 1888

Records: France, Mollières valley/1100m 1♀, Saorge/700m 1♀.

Distribution: Submediterranean.

Hedychridium cupratum (Dahlbom, 1854)

Records: France, Col de Cayolle/2350m 3♀.

Distribution: Alpine.

Hedychridium roseum (Rossi, 1790)

Records: Italy, Lago Rovine/B/1700m 1♂.

Distribution: European.

Hedychrum rutilans Dahlbom, 1854

Records: France, Mollières valley/1100m 1♂.

Distribution: European.

Holopyga fervida (Fabricius, 1781)

Records: France, Tende/900m 1♂.

Distribution: European.

Holopyga generosa Förster, 1853

Records: France, Col de Tende/B/1400m 1♂, Mollières valley/1100m 1♀, Tende/900m 1♂ 3♀.

Distribution: European.

Omalus biaccinctus (Buysson, 1893)

Records: France, Tende/900m 3♀.

Distribution: European.

Parnopes grandior Pallas, 1771

Records: France, Mollières valley/1100m 1♂ 1♀.

Distribution: European.

Philoctetes putoni (Du Buysson, 1892)

Records: France, Col de Cayolle/2300m 1♂ 1♀, Le Pra/1700m 2♀, Millefontes/B/2030m 1♀, Millefontes/C/2030m 4♀, La Foux-d'Allos/1900m 1♂.

Distribution: Alpine, restricted to the SW-Alps only, northwards to Valle d'Aosta (Rosa, 2006).

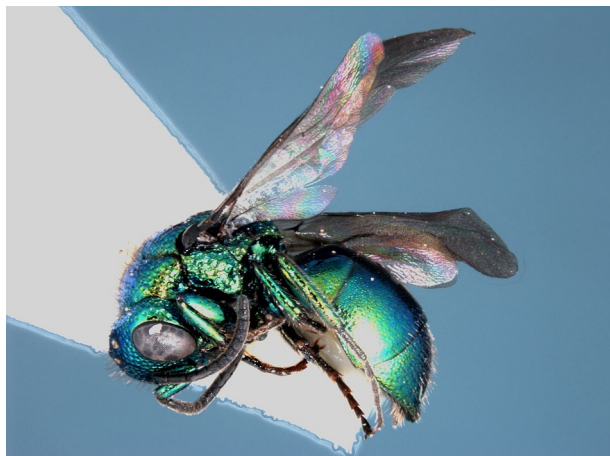


Fig. 21: *Philoctetes putoni* is a very rare alpine Chrysidid wasp. Most known records are from the Mercantour parc.

Pseudomalus auratus (Linnaeus, 1758)

Records: France, Valmasque/2200m 1♂ 1♀, Italy, Lago Rovine/B/1700m 1♂.

Distribution: European.

Spinolia segusiana (Giraud, 1863)

Records: France, La Bollène/630m 1♂ 1♀, Saorge/700m 1♀.

Distribution: Submediterranean. Rare species.

Remark: The host, *Paragymnomerus spiricornis* (Vespidae), was not collected in both localities, but nearby in Tende.



Fig. 22: The Chrysidid wasp *Spinolia segusiana* parasitizes the Vespid *Paragymnomerus spiricornis*.

Spintharina versicolor (Spinola, 1808)

Records: France, La Foux-d'Allos/1900m 3♀, Italy, Brignola/720m 1m.

Distribution: Submediterranean, northwards to Germany.

Remark: The host, *Celonites abbreviatus* (Vespidae), is widely distributed in the lower areas of the Parks.

Trichrysis cyanea (Linnaeus, 1761)

Records: France, Millefontes/C/2030m 2♀.

Distribution: European.

Family Crabronidae

Ammoplanus perrisi Giraud, 1869

Records: France, Col de Cayolle/2180m 1♂.

Distribution: European.

Ammoplanus pragensis Šnoflák, 1945

Records: France, Col de Cayolle/2180m 3♂ 2♀.

Distribution: Montane.

Argogorytes hispanicus (Mercet, 1906)

Records: France, Le Pra/1700m 2♂.

Distribution: Mediterranean.

Argogorytes mystaceus (Linnaeus, 1761)

Records: France, Le Pra/1700m 1♀.

Distribution: European.

Astata boops (Schrank, 1781)

Records: France, Isola village/900m 1♂, Mollières valley/1100m 1♂.

Distribution: European.

Astata kashmirensis Nurse, 1909

Records: France, Saorge/700m 1♂, Tende/900m 2♂ 1♀.

Distribution: European.

Astata minor Kohl, 1885

Records: France, Le Pra/1700m 1♀, Mollières valley/1100m 1m, Italy, St Lorenzo/1000m 1♀.

Distribution: European.

Bembix tarsata Latreille, 1809

Records: France, Isola/1600m 1♂, La Brigue/800m 1♂, Mollièresvalley/1100m 1♂, Mollières/1600m 2♂, Saorge/700m 3♂ 6♀, Italy, Valle Maira/Macra/900m 2♂ 1♀.

Distribution: Submediterranean.

Cerceris arenaria (Linnaeus, 1758)

Records: France, La Brigue/800m 1♂.

Distribution: European.

Cerceris quadricincta (Panzer, 1799)

Records: France, Le Pra/1700m 2♂.
Distribution: European.

Cerceris rybyensis (Linnaeus, 1771)

Records: France, Millefontes/C/2030m 1♂.
Distribution: European.

Crabro alpinus Imhoff, 1863

Records: France, Valmasque/2200m 1♀.
Distribution: Alpine, also in some other mountains in Central Europe.

Crabro cribrarius (Linnaeus, 1758)

Records: France, Le Pra/1700m 11♂ 1♀, Millefontes/C/2030m 1♂.
Distribution: European.

Crabro peltatus Fabricius, 1793

Records: France, Le Pra/1700m 1m, Millefontes/B/2030m 2♀.
Distribution: Alpine.

Crossocerus assimilis (F.Smith, 1856)

Records: Italy, Lago Rovine/B/1700m 9♂ 2♀.
Distribution: European.

Crossocerus italicus Beaumont, 1959

Records: France, Col de Cayolle/2300m, Millefontes/B/C/2030m, Valmasque/2200m.
Distribution: Alpine, north-westwards to Switzerland, described from Gran Sasso (Abruzzi, Central Italy).
Remark: The species was not mentioned from the Alps before. See also Jacobs & Schmid-Egger (in prep.) for recognition and additional comments about this species.

Crossocerus megacephalus (Rossi, 1790)

Records: Italy, Lago Rovine/B/1700m 1♂.
Distribution: European.

Crossocerus podagricus (Vander Linden, 1829)

Records: France, Mollières/1600m 1♀.
Distribution: European.

Diodontus handlirschi Kohl, 1888 R

Records: France, Col de Cayolle/2300m 2♂, Col de Cayolle/2350m 2♂.
Distribution: Alpine.

Diodontus insidiosus Spooner, 1938

Records: Italy, Brignola/700m 1♂. Valle Maira/Macra/900m 1♂.
Distribution: Submediterranean.

Diodontus luperus Shuckard, 1837

Records: France, Millefontes/C/2030m 2♂ 1♀, Italy, Lago Rovine/A/1700m 2♂, Lago Rovine/B/1700m 3♂ 3♀.
Distribution: European.

Diodontus minutus (Fabricius, 1793)

Records: France, Le Pra/1700m 1♀.
Distribution: European.

Diodontus wahisi Leclercq, 1974

Records: France, Casterino/1700m 1♂, Col de Cayolle/2350m 9♂ 2♀, Col de Tende/C/1830m 1♂ 1♀, Le Pra/1700m 1♂ 1♀, Millefontes/C/2030m 32♂ 6♀.
Distribution: Alpine, restricted to southern French Alps and Pyrenees only.



Fig. 23: The digger wasp *Diodontus wahisi* is only known from the French Alps and the Pyrenees.

Dryudella femoralis (Mocsáry, 1877)

Records: France, Col de Cayolle/2180m 1♂, Col de Cayolle/2300m 1♀, Le Pra/1700m 1♂, Millefontes/C/2030m 1♀, Italy, Lago Rovine/A/1700m 1♂.
Distribution: Montane.

Dryudella freygessneri (Carl, 1922)

Records: France, Mollières/1600m 1♀.
Distribution: Alpine.

Ectemnius dives (Lepeletier & Brullé, 1834)

Records: Italy, Brignola/720m 1♀.
Distribution: European.

Ectemnius guttatus (Vander Linden, 1829)

Records: France, Col de Cayolle/2350m 1♂.
Distribution: European.

Ectemnius lapidarius (Panzer, 1804)

Records: France, Tende/900m 1♂.
Distribution: European.

Ectemnius sexcinctus (Fabricius, 1775)

Records: France, Le Pra/1700m 2♂.

Distribution: European.

Entomognathus brevis (Vander Linden, 1829)

Records: France, Mollières/1600m 2♂, Italy, Valle Maira/Macra/900m 1♀.

Distribution: European.

Gorytes quadrifasciatus (Fabricius, 1804)

Records: France, Le Pra/1700m 1♀.

Distribution: European.

Gorytes sulcifrons (A. Costa, 1869)

Records: France, Isola/1600m 1♀, Italy, Lago Rovine/B/1700m 2♂, St Lorenzo/1000m 4♂.

Distribution: Mediterranean.

Harpactus laevis (Latreille, 1792)

Records: France, St.Sauveur/700m 2♀, Tende/900m 2♀.

Distribution: European.

Harpactus lunatus (Dahlbom, 1832)

Records: France, Millefonds/C/2030m 2♂.

Distribution: European.

Harpactus tumidus (Panzer, 1801)

Not collected in the Park.

Records: Italy, Valle Maira/Macra/900m 1♀.

Distribution: European.

Lestica clypeata (Schreber, 1759)

Records: France, La Bollène/630m 1♀, La Brigue/800m 1♂, Le Pra/1700m 1m, Mollières valley/1100m 1♂, Tende/900m 1♂ 1♀, Italy, Brignola/720m 1♂, Lago Rovine/B/1700m 3♂, Tetti Grella/980m 1♂.

Distribution: European.

Lindenius albilabris (Fabricius, 1793)

Records: France, Mollières/1600m 1♀, Italy, Lago Rovine/B/1700m 1♂.

Distribution: European.

Lindenius melinopus (Kohl, 1915)

Records: France, Casterino/1700m 1♂, Le Pra/1700m 4♂ 1♀, Millefonds/B/2030m 2m 3♀, Millefonds/C/2030m 15♂ 6♀, Mont Giraud/2500m 1♂.

Distribution: W-Mediterranean.



Fig. 24: *Lindenius melinopus* (♀) is a rare mediterranean digger wasp.

Miscophus eatoni Saunders, 1903

Records: France, Col de Tende/B/1400m 1♀, La Brigue/800m 1m, Italy, St Lorenzo/1000m 1♀.

Distribution: SW-Submediterranean, northwards to south-western Germany.

Nitela borealis Valkeila, 1974

Records: Italy, Lago Rovine/B/1700m 1♀.

Distribution: European.

Nitela lucens Gayubo & Felton, 2000

Records: Italy, Brignola/700m 1♀.

Distribution: Submediterranean.

Nitela truncata Gayubo & Felton, 2000

Records: France, St.Sauveur/700m 2♀, Italy, Brignola/700m 2♀.

Distribution: Submediterranean.

Nysson ganglbaueri Kohl, 1912

Records: France, Le Pra/1700m 1♂.

Distribution: Alpine.

Nysson maculatus Fabricius

Records: France, Tende/900m 1♀, Italy, St Lorenzo/1000m 1♂.

Distribution: European.

Nysson maculosus

Records: France, La Brigue/800m 1♀.

Distribution: European.

Oxybelus trispinosus (Fabricius, 1787)

Records: France, Le Pra/1700m 1♂, Millefonds/C/2030m 1♀, Mollières valley/1100m 1♂, St.Sauveur/700m 1♀.

Distribution: European.

Oxybelus uniglumis (Linnaeus, 1758)

Records: France, Millefont/C/2030m 1♂ 1♀.

Distribution: European.

Passaloecus gracilis (Curtis, 1834)

Records: France, Col de Cayolle/2350m 1♂, Fontan/400m 1♀, Tende/900m 2♀, Italy, Lago Rovine/B/1700m 1♀.

Distribution: European.

Passaloecus pictus Ribaut, 1952

Records: France, Saorge/700m 1♀.

Distribution: European.

Passaloecus singularis Dahlbom, 1844

Records: Italy, Brignola/700m 1♀.

Distribution: European.

Pemphredon inornata Say, 1824

Records: Italy, Brignola/700m 1♀.

Distribution: European.

Pemphredon lethifer (Shuckard, 1837)

Records: France, Saorge/700m 2♀, La Foux-d'Allos/1900m 3♂, Millefont/C/2030m 2♂, 1♀.

Distribution: European.

Philanthus triangulum (Fabricius, 1775)

Records: France, Saorge/700m 1♂, Tende/900m 2♂, Italy, Valle Maira/Macra/900m 1♂.

Distribution: European.

Psenulus pallipes (Panzer, 1798)

Records: France, La Bollène/630m 1♀.

Distribution: European.

Solierella compedita (Piccioli, 1869)

Records: France, Isola/1600m 1♀, La Brigue/800m 2♂, Millefont/C/2030m 1♂, Italy, St Lorenzo/1000m 1♂, Valle Maira/Macra/900m 2♂ 4♀.

Distribution: European.

Tachysphex brullii (F. Smith, 1856)

Records: France, Le Pra/1700m 2♂, Italy, Lago Rovine/B/1700m 3♂ 1♀, Tetti Grella/980m 1♀, Valle Maira/Macra/900m 1f.

Distribution: Submediterranean.

Tachysphex fulvitaris (A. Costa, 1867)

Records: France, Fontan/400m 1♀, Italy, Lago Rovine/B/1700m 1♂.

Distribution: European.

Tachysphex nitidior Beaumont, 1940

Records: France, Fontan/400m 1♀, Italy, St Lorenzo/1000m 2♂ 1♀.

Distribution: Submediterranean.

Tachysphex obscuripennis (Schenck, 1857)

Records: France, Isola/1600m 1♂, Le Pra/1700m 2♂ 1♀, Millefont/B/2030m 1♂ 1♀, Mollières/1600m 2♂, St. Sauveur/700m 2♂, Tende/900m 5♂, Italy, Lago Rovine/B/1700m 3♂, St Lorenzo/1000m 3♂ 1♀, Valle Maira/Stroppo/1300m 1♂.

Distribution: European.

Tachysphex pompiliformis (Panzer, 1805)

Records: France, Isola/1600m 1♀, Le Pra/1700m 1♂ 2♀, Millefont/B/2030m 1♂, Mollières/1600m 2♀, Mont Giraud/2500m 1♀, St.Sauveur/700m 2♂ 2♀, Tende/900m 1m, Italy, Brignola/700m 3♂ 2♀, Lago Rovine/A/1700m 1♀, Lago Rovine/B/1700m 1♂ 2♀, St Lorenzo/1000m 1♂.

Distribution: European.

Tachysphex psammobius (Kohl, 1880)

Records: Italy, St Lorenzo/1000m 1♀.

Distribution: European.

Tachysphex tarsinus (Lepeletier, 1845)

Records: Italy, Brignola/700m 1♂, St Lorenzo/1000m 1♀.

Distribution: European.

Tachysphex spec.

Records: Millefont/B/2030m.

Remark: The species is still under revision by Jakub Straka. It belongs to an undescribed species.

Tachysphex unicolor (Panzer, 1809)

Records: Italy, St Lorenzo/1000m 1♂.

Distribution: European.

Tachytes panzeri (Dufour, 1841)

Records: France, Mollières valley/1100m 2♀.

Distribution: European.

Trypoxylon attenuatum F. Smith, 1851

Records: France, Saorge/700m 1♂.

Distribution: European.

Trypoxylon beaumonti Antropov, 1991

Records: France, La Brigue/800m 1♀.

Distribution: European.

Trypoxylon clavicerum Lepeletier & Serville, 1825

Records: France, St.Sauveur/700m 1♂ 1♀.

Distribution: European.

Trypoxylon medium **Beaumont, 1945**

Records: France, Col de Cayolle/2300m 3♀, La Foux-d'Allos/1900m 1♀, Millefont/B/2030m 3♂, Millefont/C/2030m 3♂ 3♀, Saorge/700m 1♂, Tende/900m 1♂, Valmasque/2200m 1♀.

Distribution: European.

Trypoxylon minus **Beaumont, 1945**

Records: France, Col de Cayolle/1860m 1♀, Col de Cayolle/2180m 1♂ 1♀, Fontan/400m 1♀, Isola/1600m 1♀, La Bollène/630m 2♂ 2♀, L'Authion/2000m 1♀, Le Pra/1700m 1♂, St. Sauveur/700m 1♀, Italy, Brignola/700m 1♂ 2♀, Lago Rovine/B/1700m 1♀.

Distribution: European.

Family Mutillidae*Dasylabris maura* (Linnaeus, 1758)

Records: France, La Brigue/800m 1♀, Italy, Valle Maira/Stroppo/1300m 1♀.

Distribution: European.

Mutilla europaea **André, 1903**

Records: France, La Brigue/800m 1♂, La Foux-d'Allos/1900m 1♀, Le Pra/1700m 1♂.

Distribution: European.

Myrmilla erythrocephala (Latreille, 1792)

Records: France, Tende/900m 1♀.

Distribution: Mediterranean.

Physetopoda scutellaris (Latreille, 1792)

Not collected in the Park.

Records: Italy, Valle Maira/Stroppo/1300m 1♂,

Distribution: European.

Smicromyrme rufipes (Fabricius, 1787)

Records: France, Col de Cayolle/1860m 1♂.

Distribution: European.

Stenomutilla argentata (Villers, 1789)

Records: France, La Bollène/630m 1m, La Brigue/800m 1♂ 1♀, Saorge/700m 1♂, Tende/900m 1♂.

Distribution: Mediterranean.



Fig. 25: The females of the mediterranean *Stenomutilla argentata* (Mutillidae) are wingless..

Family Pompilidae*Agenioideus nubecula* (Costa, 1874)

Records: France, Fontan/400m 2♂, La Brigue/800m 2♀, Saorge/700m 2♂, Italy, Brignola/700m 1♂.

Distribution: European.

Anoplius viaticus (Dahlbom)

Records: France, Le Pra/1700m 1♀, Millefont/B/2030m 1♀.

Distribution: European.

Anospilus orbitalis (Costa, 1863)

Records: France, Fontan/400m 1♀, Saorge/700m 2♀.

Distribution: Mediterranean.

Aporinellus sexmaculatus (Spinola, 1805)

Not collected in the Park.

Records: Italy, Valle Maira/Macra/900m 1♀.

Distribution: European.

Aporus bicolor Spinola, 1808

Records: France, La Bollène/630m 1♂, La Bollène/630m 2♂, Saorge/700m 2♀.

Distribution: Mediterranean.

Arachnospila alpivaga (Kohl, 1888)

Records: France, La Brigue/800m 1m, St. Sauveur/700m 1♀, Tende/900m 3♂ 3♀, Italy, Brignola/700m 2♂ 1♀, Valle Maira/Macra/900m 2♂ 1♀, Valle Maira/Stroppo/1300m 1♂.

Distribution: Submediterranean.

Arachnospila anceps (Wesmael, 1851)

Records: France, Col de Tende/C/1830m 1♀, Millefont/C/2030m 1♂, Mollières/1600m 1♂, Italy, Brignola/700m 1♂, Lago Rovine/B/1700m 1♂.

Distribution: European.

Arachnospila ausa (Tournier, 1890)

Records: France, Tende/900m 2♂, Italy, Brignola/700m 1♂.
Distribution: European.

Arachnospila conjungens (Kohl, 1898)

Records: France, La Bollène/630m 1♂.
Distribution: Mediterranean.

Arachnospila fumipennis (Zetterstedt, 1838)

Records: France, Col de Tende/C/1830m 1♀, Millefonts/C/2030m 1♂, Valmasque/2200m 1♂, Italy, Lago Rovine/A/1700m 1♂, Lago Rovine/B/1700m 1♀.
Distribution: European.

Arachnospila fuscomarginata (Thomson, 1870)

Records: France, Le Pra/1700m 1♀, Tende/900m 1♂.
Distribution: European.

Arachnospila hedickei (Haupt, 1929)

Records: France, Col de Cayolle/2180m 1♂, Le Pra/1700m 1♂ 2♀, Millefonts/C/2030m 1♂, Italy, Lago Rovine/B/1700m 1♂.
Distribution: European.

Arachnospila minutula (Dahlbom, 1842)

Records: France, Le Pra/1700m 1♂, Millefonts/B/2030m 1♀.
Distribution: European.

Arachnospila nivalabnormis (Wolf 1965)

Records: France, Col de Cayolle/2180m 1♂, Col de Tende/C/1830m 1♂, Millefonts/C/2030m 2♂, Mont Giraud/2500m 1♂, Valmasque/2200m 1♂.
Distribution: Alpine.

Arachnospila silvana (Kohl, 1886)

Records: France, Millefonts/C/2030m 1♂.
Distribution: Submediterranean, northwards to East-Germany.

Arachnospila sogdianoides Wolf, 1964

Records: France, Col de Tende/C/1830m 1♂, Millefonts/B/2030m 1♀.
Distribution: European.

Auplopus albifrons (Dalman, 1823)

Records: France, Col de Cayolle/1860m 1♀, Col de Cayolle/1860m 1♀, Col de Tende/B/1400m 1♂, Isola/1600m 1♀, La Bollène/630m 1♀, La Bollène/630m 1♂, Le Pra/1700m 1♀, Millefonts/B/2030m 1♀, Millefonts/C/2030m 4♂, Saorge/700m 1♀, Tende/900m 2♀, Italy, Brignola/700m 1♀, Lago Rovine/B/1700m 4♂ 1♀, St Lorenzo/1000m 1♀.
Distribution: European.

Auplopus carbonarius (Scopoli, 1763)

Records: France, Tende/900m 1♀.
Distribution: European.

Auplopus rectus (Haupt, 1927)

Records: France, La Bollène/630m 1♂, La Brigue/800m 1♂, Millefonts/B/2030m 4m, Millefonts/C/2030m 1♂, Saorge/700m 1♂, Tende/900m 4♂, Italy, Brignola/700m 7♂ 4♀, Lago Rovine/B/1700m 3♂, St Lorenzo/1000m 1♀, Valle Maira/Macra/900m 2♂ 5♀.
Distribution: Submediterranean.

Caliadurgus fasciatellus (Spinola, 1808)

Records: France, St.Sauveur/700m 1♀.
Distribution: European.

Cryptocheilus fabricii (Vander Linden, 1827)

Records: France, Fontan/400m 1♀, Tende/900m 1♂ 5♀.
Distribution: European.

Cryptocheilus notatus (Rossi, 1790)

Records: France, Col de Cayolle/1860m 1♀, Col de Tende/B/1400m 3♀, Isola/1600m 1♂, Isola/1600m 2♂, La Bollène/630m 1m, La Bollène/630m 2♂, La Bollène/630m 4♂ 1♀, Le Pra/1700m 1♀, Mollières/1600m 1♀, Tende/900m 1♂, Italy, Brignola/700m 4♂, Brignola/700m 5♂, Lago Rovine/B/1700m 2♂, St Lorenzo/1000m 1♂ 1♀, Valle Maira/Macra/900m 1♂.
Distribution: European.

Cryptocheilus versicolor (Scopoli, 1763)

Records: France, Tende/900m 1♀.
Distribution: European.

Dipogon variegatus (Linnaeus, 1758)

Records: France, Fontan/400m 2♀, La Bollène/630m 2♂.
Distribution: European.

Entomobora plicata (Costa, 1883)

Records: France, La Brigue/800m 1♀.
Distribution: W-Mediterranean, distribution restricted to Corsica, Sardinia and a small area in south-eastern France (between Menton and Tende).

Eoferreola rhombica (Christ, 1791)

Records: France, Col de Tende/C/1830m 1♂, Millefonts/C/2030m 1♀, Tende/900m 2♂.
Distribution: European.

Episyron gallicum (Tournier, 1889)

Not collected in the Park.
Records: Italy, Valle Maira/Stroppo/1300m 2m.
Distribution: Submediterranean.

Evagetes crassicornis (Shuckard, 1835)

Records: France, Col de Tende/C/1830m 1♂, Millefonds/C/2030m 1♂, Italy, Tetti Grella/980m 1♀.

Distribution: European.

Evagetes dubius (Vander Linden, 1827)

Not collected in the Park.

Records: Italy, Valle Maira/Macra/900m 1♀.

Distribution: European.

Evagetes sahlbergi (Morawitz, 1893)

Records: France, Col de Cayolle/2300m 1♂, Le Pra/1700m 1♀, Millefonds/C/2030m 1♂ 1♀.

Distribution: European.

Homonotus sanguinolentus (Fabricius, 1793)

Records: France, La Brigue/800m 1♀.

Distribution: European.

Priocnemis exaltata (Fabricius, 1775)

Records: France, Col de Cayolle/1860m 1♂, Le Pra/1700m 3♀.

Distribution: European.

Priocnemis perturbator (Harris, 1780)

Records: France, Le Pra/1700m 1♀.

Distribution: European.

Priocnemis pusilla (Schiödte, 1837)

Records: France, Fontan/400m 1♀, Le Pra/1700m 2♀.

Distribution: European.

Priocnemis susterai Haupt, 1927

Records: France, Le Pra/1700m 1♀, Millefonds/C/2030m 1♀, Italy, Lago Rovine/A/1700m 1♀, Lago Rovine/B/1700m 1♀.

Distribution: European.

Priocnemis vulgaris (Dufour, 1841)

Records: France, Col de Tende/B/1400m 1f, Millefonds/C/2030m 1♀.

Distribution: European.

Tachyagetes filicornis (Tournier, 1889)

Records: France, St.Sauveur/700m 1♂ 1♀, Tende/900m 1♀, Italy, Valle Maira/Stroppo/1300m 1♀.

Distribution: Submediterranean.

Family Sapygidae*Sapyga decemguttata* (Jurine, 1807)

Records: France, La Bollène/630m 1♀.

Distribution: European.

Sapyga similis (Fabricius, 1793)

Records: France, Casterino/1700m 1♀.

Distribution: European.

Family Scoliidae*Scolia hirta* (Schrank, 1781)

Records: France, La Bollène/630m 3♂.

Distribution: European.

Scolia sexmaculata (O.F. Müller, 1766)

Records: France, La Bollène/630m 1♂, La Brigue/800m 3♂, Mollières valley/1100m 2♂ 1f, Saorge/700m 2♂, Tende/900m 6♂ 1♀.

Distribution: European.

Family Sphecidae*Ammophila campestris* Latreille, 1809

Records: France, Col de Tende/C/1830m 1♂, La Foux-d'Allos/1900m 2♂, Le Pra/1700m 4♂ 1♀, Millefonds/B/2030m 8♂ 3♀, Millefonds/C/2030m 3♂ 2♀, Mollières/1600m 2♂, Italy, Lago Rovine/A/1700m 3♂, Lago Rovine/B/1700m 1♂, St Lorenzo/1000m 1♂, Valle Maira/Macra/900m 4♂ 2♀.

Distribution: European.

Ammophila heydeni Dahlbom, 1845

Records: France, Fontan/400m 2♀, La Bollène/630m 2♀, La Brigue/800m 3♂ 1♀, Saorge/700m 2♂, Tende/900m 1♀, Italy, Valle Maira/Macra/900m 2♂ 1♀, Valle Maira/Stroppo/1300m 1♂.

Distribution: Submediterranean.

Ammophila sabulosa (Linnaeus, 1758)

Records: France, La Foux-d'Allos/1900m 2♂, 1♀, Le Pra/1700m 2♂ 1♀, Millefonds/C/2030m 1♂, Mollières/1600m 2♂, St.Sauveur/700m 1♂, Italy, Lago Rovine/A/1700m 1♂, Lago Rovine/B/1700m 3♂ 1♀, St Lorenzo/1000m 3♂ 1♀, Tetti Grella/980m 1♂, Valle Maira/Stroppo/1300m 1v.

Distribution: European.

Hoplammophila clypeata (Mocsáry, 1883)

Records: France, La Bollène/630m 1♂.

Distribution: Mediterranean.

Palmodes occitanicus (Lepeletier & Serville, 1828)

Records: France, Fontan/400m♂.

Distribution: Mediterranean.

Podalonia affinis (W. Kirby, 1798)

Records: France, Le Pra/1700m 1♂ 1♀, Millefonds/B/2030m 1♂ 1♀, Millefonds/C/2030m 1♂, Mont Giraud/2500m 1♀.

Distribution: European.

Podalonia alpina (Kohl, 1888)

Records: France, Col de Cayolle/1860m 1♀, Col de Cayolle/2350m 5♂ 1♀, Col de Tende/C/1830m 1♂, Le Pra/1700m 1♂, Millefontes/B/2030m 2♀, Millefontes/C/2030m 2♂, France, Mont Giraud/2500m 1♀, Italy, Lago Rovine/A/1700m 1♀.

Distribution: Alpine.

Podalonia hirsuta (Scopoli, 1763)

Records: France, Col de Cayolle/2350m 1♂, Col de Tende/C/1830m 1♀, La Foux-d'Allos/1900m 1♀, L'Authion/2000m 2♂ 2♀, Le Pra/1700m 1♂, Millefontes/B/2030m 1♂, Millefontes/C/2030m 1♀, Tende/900m 1♀,

Distribution: European.

Sceliphron caementarium (Drury, 1773)

Records: France, La Brigue/800m 1♀, La Foux-d'Allos/1900m 1♀, Italy, Valle Maira/Macra/900m 1♀,

Distribution: Introduced to France from America, now widespread in the northern mediterranean area.

Sceliphron curvatum (F. Smith, 1870)

Records: France, Mollières valley/1100m 7♀.

Distribution: European, introduced to Austria from southern Central Asia, now widespread in southern and central Europe.

Sphex flavipennis Fabricius, 1793

Records: France, La Bollène/630m 1♂.

Distribution: Mediterranean.

Sphex funerarius Gussakovskij, 1934

Records: Italy, St. Lorenzo/1000m 1♂, Valle Maira/Macra/900m 1♀.

Distribution: European.

Family Tiphiidae*Meria tripunctata* (Rossi, 1790)

Not collected in the Park.

Records: Italy, Valle Maira/Macra/900m 1♂ 1♀.

Distribution: Submediterranean.

Tiphia femorata Fabricius, 1775

Records: France, Tende/900m 2♀, Italy, St Lorenzo/1000m 1♂.

Distribution: European.

Family Vespidae*Ancistrocerus claripennis* Thomson, 1874

Records: Italy, Lago Rovine/B/1700m 3♂.

Distribution: European.

Ancistrocerus gazella (Panzer, 1798)

Records: France, Fontan/400m 1♀, Italy, Lago Rovine/B/1700m 1♂.

Distribution: European.

Ancistrocerus oviventris (Wesmael, 1836)

Records: France, Casterino/1700m 1♀, France, Col de Cayolle/1860m 1♂, Col de Cayolle/2350m 1♀, Col de Tende/C/1830m 1♀, La Foux-d'Allos/1900m 2♂, Le Pra/1700m 1♂ 2♀, Millefontes/C/2030m 1m, Valmasque/2200m 1♂ 1♀, Italy, Lago Rovine/A/1700m 9♂, Lago Rovine/B/1700m 5♂ 1♀.

Distribution: European.

Ancistrocerus renimacula (Lepelletier, 1841)

Records: France, Tende/900m 1♂.

Distribution: Submediterranean.

Celonites abbreviatus (Villers, 1789)

Records: France, La Foux-d'Allos/1900m 4♂ 1♀, Le Pra/1700m 3♀, Mollières valley/1100m 2♂, Tende/900m 1♂, Italy, Brignola/720m 1♀, Brignola/720m 3♀, Lago Rovine/B/1700m 1♀, Italy, Valle Maira/Macra/900m 1♂ 1♀.

Distribution: European.

Celonites mayeti Richards, 1962

Records: France, Tende/900m 1♂, Fontan/400m 1♂ 1♀.

Distribution: SW-Mediterranean, common in Spain, very rare in southern France.



Fig. 26: The honey wasp *Celonites mayeti* (♂) is only known from a few places in southern France and from Spain.

Ceramius tuberculifer Saussure, 1853

Records: France, Col de Cayolle/1860m 1♂ 1♀, 1♂, La Foux-d'Allos/1900m 6♂ 1♀.

Distribution: SW-Mediterranean, northwards to Valle de Durance.



Fig. 27: *Ceramius tuberculifer* (♂) is a large honey wasp species with a southwestern mediterranean distribution.

Dolichovespula norvegica (Fabricius, 1781)

Records: France, Casterino/1700m 1♀.

Distribution: European.

Dolichovespula sylvestris (Scopoli, 1763)

Records: France, Col de Tende/B/1400m 1♀, France, Isola/1600m 1♀, La Bollène/630m 1♀, La Brigue/800m 2♀, La Foux-d'Allos/1900m 1♀, Le Pra/1700m 1♀, Millefontes/B/2030m 1♀, Tende/900m 1♀, Italy, Brignola/700m 1♀, Lago Rovine/B/1700m 2♀, St Lorenzo/1000m 1♀.

Distribution: European.

Eumenes coarctatus (Linnaeus, 1758)

Records: France, Mollières valley/1100m 1♂, Mollières/1600m 1♂, Italy, St Lorenzo/1000m 2♂.

Distribution: European.

Eumenes coarctatus lunatus Fabricius, 1804

Records: France, Fontan/400m 3♂, La Brigue/800m 2♂ 3♀, Mollières valley/1100m 1♂, Saorge/700m 2♂ 2♀, Tende/900m 2♂, Italy, Entraque/900m 1♂.

Distribution: Submediterranean.

Remarks: Nomenclature follows Gusenleitner (1999). The taxon *lunulatus* differs mainly in colour from *coarctatus* s.str. and replaces the latter in southern Europe. The state as a subspecies has to be verified, most probable is it only a colour form of *coarctatus* from southern Europe.

Eumenes pedunculatus (Panzer, 1799)

Records: France, Mollières valley/1100m 1♂,

Distribution: European.

Eumenes subpomiformis Blüthgen, 1938

Records: France, Col de Cayolle/2300m 1♂, Col de Cayolle/2350m 1♀, La Bollène/630m 1♀, La Brigue/800m

4♀, Le Pra/1700m 1♂, Mollières valley/1100m 4♂, Tende/900m 1♂, Italy, Lago Rovine/B/1700m 2♂ 1♀.

Distribution: European.

Euodynerus curictensis Bluethgen, 1940

Records: France, La Bollène/630m 1♂, La Brigue/800m 1♂, Tende/900m 2♂ 1♀, Italy, Lago Rovine/B/1700m 1m, Valle Maira/Stroppo/1300m 1♀.

Distribution: Submediterranean.

Euodynerus dantici (Rossi, 1790)

Records: France, Mollières valley/1100m 1♂.

Distribution: European.

Euodynerus quadrifasciatus (Fabricius, 1793)

Records: France, Millefontes/C/2030m 1♂, France, Valmasque/2200m 1♀.

Distribution: European.

Katamenes arbustorum (Panzer, 1799)

Records: France, La Foux-d'Allos/1900m 2♂.

Distribution: Submediterranean.

Leptochilus alpestris (Saussure, 1856)

Records: France, La Bollène/630m 1♀, La Brigue/800m 1♀, Tende/900m 1♂, Italy, Valle Maira/Macra/900m 1♂.

Distribution: Mediterranean, northwards to southern Germany.

Leptochilus moustiersensis Giordani Soika, 1973

Records: France, La Brigue/800m 1♀.

Distribution: SW- Mediterranean, only known from two places in France: Moustiers (type locality) and Montpellier. The present female is the third finding of this very rare species.



Fig. 28: This photo represent the third finding of *Leptochilus moustiersensis* (♀). This Eumenid wasp has a southern French distribution only.

Leptochilus regulus (Saussure, 1855)

Records: France, Fontan/400m 1♂, Tende/900m 1♂.
Distribution: Submediterranean.

Leptochilus tarsatus (Saussure, 1856)

Records: France, St. Sauveur/700m 1♀, Italy, Lago Rovine/B/1700 4♂ 3♀.
Distribution: Submediterranean.

Odynerus alpinus Schulthess, 1897

Records: France, Isola/2000m 1♂.
Distribution: Alpine.

Odynerus melanocephalus (Gmelin, 1790)

Records: France, La Foux-d'Allos/1900m 1♀.
Distribution: European.

Odynerus reniformis (Gmelin, 1790)

Records: France, La Foux-d'Allos/1900m 2♂, Millefontes/C/2030m 1♂.
Distribution: European.

Odynerus spinipes (Linnaeus, 1758)

Records: France, Col de Cayolle/2350m 2♂ 2♀.
Distribution: European.

Paragymnomerus spiricornis (Spinola, 1808)

Records: France, Mollières valley/1100m 1♂, Tende/900m 1♂.
Distribution: Submediterranean.

Parodontodynerus ephippium (Klug, 1817)

Records: France, Saorge/700m 1♀.
Distribution: Mediterranean.

Polistes atrimandibularis Zimmermann, 1930

Records: France, Mollières/1600m 1♀.
Distribution: Distribution: Submediterranean.

Polistes biglumis (Linnaeus)

Records: France, Col de Cayolle/2300m 1♀, Col de Cayolle/2350m 1♀, La Foux-d'Allos/1900m 1♀, Le Pra/1700m 5♀, Millefontes/C/2030m 3♀, Mollières valley/1100m 1♀, Mollières/1600m 1♀, Tende/900m 2♀, Italy, Lago Rovine/A/1700m 2♀, Lago Rovine/B/1700m 8♀, St Lorenzo/1000m 2♀.
Distribution: European.

Polistes dominula (Christ, 1791)

Records: France, Fontan/400m 2♀, La Bollène/630m 4♀, La Brigue/800m 6♀, Mollières valley/1100m 2♀, Saorge/700m 2♀, Tende/900m 2♂ 1♀.
Distribution: European.

Polistes nimpha (Christ, 1791)

Records: France, Fontan/400m 1♀, La Bollène/630m 1♀, La Brigue/800m 3♀.

Polistes semenowi Morawitz, 1889

Records: France, Tende/900m 1♂.
Distribution: Distribution: Submediterranean.

Pseudepipona lativentris (Saussure, 1855)

Records: France, Tende/900m 1♀.
Distribution: Mediterranean.

Stenodynerus bluethgeni van der Vecht, 1971

Records: France, La Brigue/800m 1♀, Le Pra/1700m 1♂.
Distribution: European.

Stenodynerus laticinctus (Schulthess, 1897)

Records: France, Valmasque/2200m 5♂ 1♀.
Distribution: Alpine.

Stenodynerus punctifrons (Thomson, 1874)

Records: France, Col de Cayolle/2350m 1m, Col de Cayolle/2350m 3♂, La Foux-d'Allos/1900m 1♂, Le Pra/1700m 1♂.
Distribution: Alpine..

Symmorphus gracilis (Brullé, 1832)

Records: France, Isola/1600m 1♂, Le Pra/1700m 1♂, Italy, Lago Rovine/B/1700m 4♂.
Distribution: European.

Vespa crabro Linnaeus, 1758

Records: France, Fontan/400m 1♀.
Distribution: European.

Vespula austriaca (Panzer, 1799)

Records: France, L'Authion/2000m 1♀.
Distribution: European.

Vespula rufa (Linnaeus, 1758)

Records: France, L'Authion/2000m 2♀.
Distribution: European.

Vespula vulgaris (Linnaeus, 1758)

Records: France, L'Authion/2000m 1♀, Le Pra/1700m 1♀.
Distribution: European.

Discussion

Zoogeography

Generalities

Together I could examine 3083 specimens, which belong to 472 species (256 species/1940 specimens of bees and 216 species/1143 specimens of wasps). For detailed species numbers, see table 1. Thirteen species were collected in Valle Maira only. Because they can be expected to occur in the Park, they are included here.

Table 1: Number of species

Family	species
AMPULICIDAE	2
APIDAE (BEES)	256
CHRYSIDIDAE	42
CRABRONIDAE	70
MUTILLIDAE	6
POMPILIDAE	37
SAPYGIDAE	2
SCOLIIDAE	2
SPHECIDAE	12
TIPHIIDAE	2
VESPIDAE	41
total	472

The Hymenoptera species can be assigned to different zoogeographic zones. The zoogeographical system used here is a simplified system only, and summarizes

some of the established zones mostly used in entomology. In table 2, the species numbers for each zone are listed.

Table 2: Number of species (and percentage) from different zoogeographic zones.

European

The largest proportion of species is European (309 species = 65%). These species are widely distributed in central and southern Europe, and often reach Scandinavia in the north. Most of them also continue in Asia or North Africa. In the Alps, they occur in various biotops and levels of altitude. Some of them climb up to 2000 m or higher.

Alpine and montane

About 22 species (=5%) are montane, and 30 species (=6%) alpine. Both groups are limited in to higher mountain areas only. While most of them are restricted in their distribution to the Alps or other mountains in Europe, others occur also in Central Asia or North West Africa (Atlas mountains). The classification between "montane" and "alpine" is not clear-cut in every case. The **alpine** species occur typically in alpine grassland above 1800 m up to 2500 m or higher. They represent the most characteristic aspect of the Park fauna, similar to Capricorn (*Capra ibex*) or Marmot (*Marmota marmota*) in the Mammalian fauna.

Within the alpine fauna are some subclassifications. Some of the alpine species are widely distributed in the whole Alps. Examples are *Hylaeus glacialis*, *Podalonia alpina*, *Crabo alpinus*, *Crabro peltatus*, *Diodontus handlirschi* or *Arachnospila nivalabnormis*. These species are normally common in suited habitats.

Table 2: Number of species (and percentage) from different zoogeographic zones.

	mediterranean	submediterranean	european	montane	alpine	total
bees	21	31	173	18	13	256
% bees	8 %	12 %	68 %	7 %	5 %	100 %
wasps	26	33	136	3	18	216
% wasps	12 %	15 %	63 %	1 %	8 %	100 %
total	47	64	309	22	30	472
% total	10 %	14 %	65 %	5 %	6 %	100 %

Another fraction of the alpine species is restricted to the western or south-western Alps only. Their range is often limited in the north-east by the Aosta region (in the north-west Italian Alps) or in the Wallis (south-west Swiss Alps). Southwards, they reach the Mercantour Park region, what represent also the southern limit of the Alps. An example for such a distribution pattern is *Philoctetes putoni*. Other species occur in the south-western part of the Alps only (northwards to around Barcelonnette), but they are absent northwards in Aosta or Wallis region. Examples are *Panurginus montanus alpinus* (what is probable a valid species) and *Diodontus wahisi*. *Tachysphex excelsus* Turner, 1917 in Bitsch et al. (2007) was described from the area north of Mercantour (St. Veran, Mt. Visio, Barcelonnette, etc.) and is another representative for the group of the western Alps endemics. It can also be expected in the Mercantour Park. According to Jakub Straka it is a valid species different from populations outside of the Alps. Within the genera *Hylaeus* and *Lasioglossum* more species of this distribution pattern can be expected, but both genera are not examined here in deep. *Andrena montana* is also a species that may consist of some sibling species restricted to small areas in the Alps.

The **montane** species descend to lower altitude as the alpine species, but they also occur in regions about 2000 m or higher. They are not restricted to the Alps or other high mountains, and occur in some Central European lower mountain ranges (e.g. *Andrena intermedia*, *Andrena rufizona*, *Dryudella femoralis*). The so-called "boreoalpine" or "boreomontane" species are also summarized as montane in the present examination. These species hold a divided distribution areal: Alps and Scandinavia, with some scattered populations in lower mountain ranges in-between. Some of them also occur in the dunes of the Baltic Sea in north Germany or north Poland (*Colletes floralis*, *Colletes impunctatus*, *Osmia xanthomelana*). In the Alps these species settle in various "open" habitats above 1600 m. Some of them do not occur above 1800 m (*Chelostoma grande*).

A special species group are the representatives of the large "inner alpine dry valleys". These xerothermic (very hot and dry) habitats are characterized by typical vegetation, the "Steppenheide". The major "inner alpine dry valleys" in the Alps are the Vinschgau in Alto Adige (northeast Italy), Valtellina (Lombardia/Italy), the Wallis (southern Switzerland), Valle d'Aosta (north-west Italy), and the Valle de Durance (east France). Smaller areas exist also in the Mercantour Park (in lower valleys as Roya valley etc.). A typical inhabitant of this type of habitat is *Chelostoma grande*, common in the Mercantour Park. *Osmia dalmatica*, another characteristic species of

the Steppenheide area, was not found in the Park, but in Valle Maira near Cuneo. The Steppenheide also hosts many mediterranean species. Some of them advance deeply in the Alps and are therefore also characteristic for the Steppenheide (e.g. *Paragymnomerus ephippius* and its parasite, *Spinolia segusiana*, or *Ceramius tuberculifer* and its parasite, *Chrysis emarginatula*). The common masarid wasp *Celonites abbreviatus* with its parasite, *Spintharina versicolor* is also widely distributed in the whole Alps and occurs mostly in the "Steppenheide" or similar habitats.

Mediterranean and Submediterranean

The "mediterranean" species represent the second important species group in the Park. These species need zones with high climate condition (temperature, sun exposure, dryness). Their distribution northwards or to higher altitudes is mainly restricted by temperature. The most exigent species (for temperature) occur only near the coast of the Mediterranean sea and inhabit only extreme hot places in the lower valleys like Roya, Tinée or Vésubie in the Mercantour Park. Examples are the Sphecid wasps *Hoplammophila clypeata* or *Sphex flavipennis*.

With decreasing thermal requirements, these species enlarge their distribution area versus North and to higher altitude. Some of them such as the Honey wasp *Ceramius tuberculifer* reach altitudes of around 1800 m at the end of the large river valleys. *Ceramius tuberculifer* was found in Foux d'Allos at the final end of the Gard River valley. The most expansive species of the Mediterranean type reach south-west Germany (e.g. *Panurgus dentipes*, *Ceratina chalybea*, *Agenioideus nubecula*). These species also occur in the lowlands of North Italy and penetrate the warm Alpin valleys from south-eastwards. The Mediterranean parts of the fauna from Valle Maira, Susa valley (Piemonte), or Aosta Valley also contain several Mediterranean species with high thermal requirements.

It is not possible to give a clear limitation between strong mediterranean species and "submediterranean" species, because there are many transitions in the northern distribution limit of these species. For practical reason, I treat all species here as "mediterranean", which do not cross the Alps versus north or do not reach Switzerland. The remaining species and therefore all mediterranean species occurring in Switzerland or southwest Germany are treated here as submediterranean.

The (sub)mediterranean species can also be divided into species restricted to south-west Europe only (e.g. *Panurgus dentipes*, *Ceratina chalybea*, *Ceramius tuberculifer*, *Celonites mayeti*), and species which are widely

Tab. 3: Target species for purpose of Nature protection from Mercantour (Me) and Alpi Maritime (AM). Abbreviations: med = Mediterranean.

family and species	Me	AM	explanation
APIDAE			
<i>Andrena asperima</i>	x		Rare med species with SE distribution limit in the Park
<i>Chelostoma grande</i>	x		Rare montane species with dense population in the Park
<i>Hylaeus brachycephalus</i>	x		Rare med species with SE distribution limit in the Park
<i>Megachile opacifrons</i>	x		Rare med species.
<i>Osmia emarginata</i>	x		Rare SW-med species
<i>Panurginus montanus alpinus</i>	x	x	Alpine species or subspecies, restricted to southernmost SW Alps only.
<i>Halictus spec.</i>	x		Undescribed species (Ebmer, in prep.), only known from Mercantour
CHRYSIDIDAE			
<i>Chrysis hirsuta</i>	x		Rare montane species.
<i>Chrysis lucida</i>	x		Rare alpine species, first record for France
<i>Philoctetes putoni</i>	x		Very rare alpine species, restricted to the French Alps and Aosta, with large population in the Park.
<i>Spinolia segusiana</i>	x		Rare med species.
<i>Chrysura spec.</i>	x		Undescribed, only known from Mercantour
CRABRONIDAE			
<i>Crossocerus italicus</i>	x		Rare alpine species (Switzerland, Gran Sasso in Central Italy), first record for France, with large population in the Park.
<i>Diodontus wahisi</i>	x		Very rare alpine species (restricted to the French Alps and Pyrenees), with large population in the Park.
<i>Nysson ganglbaueri</i>	x		Very rare alpine species.
<i>Tachysphex spec.</i>	x		Undescribed, also known from another place in the east Alps.
POMPILIDAE			
<i>Entomobora plicata</i>	x		Very rare med species, with small distribution area in Corsica, Sardinia and eastern France between Menton and Tende.
VESPIDAE			
<i>Celonites mayeti</i>	x		Rare med species, only very few findings in France, more common in Spain.
<i>Leptochilus moustirsensis</i>	x		Very rare med species, only known from two other locations in southern France.

distributed in the mediterranean area.

The Mercantour Park has some peculiarities in the mediterranean fauna: Conspicuously, several species with high climate needs could be observed on altitudes above 2000 m. Some of them were found in the peak region of some of the southernmost mountains of Mercantour (e.g. in Millefontes). Such species are: *Hylaeus brachycephalus*, *Chrysura laevigata* or *Lindenius melinopus*. Also many submediterranean species are found above 2000 m, like *Xylocopa violacea*, *Auplopus albifrons* or *Cryptocheilus notatus*. Even in the southern Central Alps in Switzerland or Aosta, they do not occur above 1500 m. This exceptional finding gives a hint to very particular climate conditions in the Mercantour Park.

Another particularity is the finding of some very rare species with a small overall distribution area. They all had been found in lower places of the Mercantour Park, all of them in the Roya valley. These are *Entomobora plicata*, *Celonites mayeti* and *Leptochilus moustirsensis*.

Nature conservation

An important question in the present examination was about the state of conservation and protection of the species. This subject cannot be discussed in detail, but I will give some short impressions I have obtained while carrying out the field work.

I treat only the higher alpine grassland (above 1800 m) and the xerothermic open grassland in the lowland. Other biotops as alpine grassland between 1000 and 1800 m or forests were not assessed sufficiently.

Higher alpine grassland

The higher grassland of the Alps (above 1800 m) is confronted with some risks for the natural fauna and flora. The first is tourism, and here mainly damage caused by ski tourism. Modern ski areas influence the landscape and flora markedly. Artificial grass varieties replace the natural flora, for which insects will lack resources and decrease in numbers. The area around Isola 2000 is a characteristic example for such a large destruction of landscape by men.

The second and more fatal risk for alpine vegetation and fauna is overgrazing by cattle, goats and sheeps. This problem is normally known from areas far away (Sahel zone, eastern Turkey, Iran), but it is a serious and badly respected problem in the whole Alps. A too high stocking rate changes vegetation markedly, and insects will not find suitable resources (feeding, nesting, etc.). For an entomologist, collecting in a cattle pasture is a bad experience, because the number of insects is low to zero.

The problem will often not be noticed by tourism managers and politicians, because cattle-influenced pasture is also green like natural grassland, and differences in species quality can be found by experts only. Adequate and detailed examinations about this subject are rare, but the negative effects on fauna are significant.

My impression in the Mercantour Park was that both risks do not occur or only cause marginal and local damages, and that nature in general is in a really good state. Most biotops above 1800 m are not influenced by man. This is without doubt the reason for the high species diversity in wasps and bees. In the Marittime Park, I found the Valley south of Termini dei Valdieri (around Refuge Regina Elena, in around 1800 m) heavily overgrazed by cattle.

Xerothermic biotops in the lowland

The other group of "valuable" biotops (from a Hymenopteran viewpoint) are the dry meadows and "Steppenheide" biotops in the southern river Valleys. They mostly result from ancient agricultural use, and are comparatively small (compared with Wallis or Aosta valley). Nevertheless, they are numerous and occur in a dense network of similar and closely related biotope structures, which facilitate the species exchange. This results in high species diversity and some very rare and remarkable species. The risk for such biotopes is natural afforestation. Upcoming shrub vegetation can be ob-

served in many collecting places (e.g. in Saorge). This development should carefully be observed within the next years.

General aspects – Mercantour Park

The Park possesses a very rich aculeate fauna. The alpine and montane Fauna of the Mercantour Park is nearly complete (compared with the expectations from literature). Some important and rare species occur in high and unexpected population density. Suited biotops similar to the examined biotops exist in large numbers (what I could see by passing on the road). Also the fauna of the dry river valleys is very rich and contains some really rare and highly remarkable species.

Summarizing the Mercantour Park contains a very exceptional fauna, what is worth to be protected. As far as I can see, the efforts for nature conservation in the Park are successful.

General aspects – Alpi Marittime Park

The Italian Park is smaller and situated on the north side of the main mountain range. This geographical conditions results in a marked lower species diversity, and I could not find most of the main target species from Mercantour in the Alpi Marittime. Nevertheless the fauna is rich in species, e.g. around Lago Rovine and more species can be expected, when collecting in other places. Another potential biotope structure is the dry meadows on the north side of the Park (near Entraque and westwards). I could only examine a few places, but I think many more species live here. Also the limestone habitats north of the Park may contain an interesting mediterranean fauna. I could only collect near Brignola, some kilometres northwards of the Park, but my visit was too short and results were because of the heat too poor to get a final impression.

Target species for nature conservation

In the table 3 the major target species are defined for use in nature conservation. These species are suited for an evaluation of the Park or parts of it. I chose only the most important species. Criteria are mainly distribution aspects (small distribution area, rarely collected, etc.). For a detailed evaluation of the Park and the use of the Aculeate species in a nature conservation management the ecology of the species should also be taken into account. With this information, many more target species also with regional significance could be chosen from the main species list.

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