

# Journal of Insect Biodiversity



ISSN: 2147-7612

## RESEARCH ARTICLE

### Preliminary list of Coleoptera heritage species of the Talassemtane National Park, Morocco

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**Abstract:** A faunistic survey on beetles was conducted within the Talassemtane National Park (Western Rif, District of Chefchaouen), in order to improve knowledge of their local diversity, to assess species and provide the first list of heritage species. This is an inventory that took place for 3 consecutive years (2013-2015). Out of 550 species identified so far, 137 are processed in this document, which lists heritage species: 67 endemic to Morocco, 20 rare saproxylic and 48 species new to Morocco, including two new to science.

**Key words:** Morocco, Talassemtane National Park, heritage value, Coleoptera biodiversity, conservation.

## Introduction

The Talassemtane National Park (PNTLS) is one of the six Important Plants Areas (IPA) priorities for conservation actions in the Mediterranean region (Taleb & Fennane 2011). Located in the western part of the calcareous ridge of Rif's mountain range, the PNTLS offers natural landscapes of great heritage value across the Mediterranean. Also, this region hosts the most important of the only two forests of an endemic fir tree *Abies maroccana* Trab. and other threatened plant species (Alaoui *et al.* 2011). In addition to its important floristic value, the PNTLS houses a diverse but poorly known wildlife; including insects. Over a quarter of identified animal species are beetles (May 1988) and are the

dominant taxa in forests (Bouget 2004). Therefore it is important for the Forest Department to include the diversity data of Coleoptera while making policy decisions.

Information on beetles and their distribution in Morocco is incomplete in mountainous and forest areas of the Rif, whose exploration is difficult. Studies on PNLTS coleopteran are sporadic and hence do not cover the coleopteran diversity entirely (Escalera 1914; Peyerimhoff 1949; Kocher 1956-1964; Benhalima 2004; Arahou 2008; Mouna 2013). At the PNLTS, invertebrates have been less studied than plants and vertebrates. Few workers have examined flies (Belqat *et al.* 2001), ants (Taheri *et al.* 2014) and water beetles (Benamar *et al.* 2011) of the study area.

In general, no Moroccan or African law, referring to insects' protection exists, and, Morocco does not have a red list of threatened species adapted to its territory such as Europe: only the International Red List of Threatened Species (IUCN) exists as a baseline data. It is, therefore, essential to determine a list of species requiring urgent protection measures.

A survey of beetles of the PNLTS was conducted during 3 consecutive years (2013 to 2015), to establish a first list of heritage species (saproxylic rare, endemic, new species to the country and to science), which will facilitate the establishment of a management policy to conserve these singular forests of Rif region.

## Material and methods

### Study area

PNLTS covers an area of 64,601 ha. Two-thirds of the park are within the province of Chefchaouen and one-third belongs to the province of Tetouan. It is mainly formed by the southern portion of the Rifian calcareous ridge and includes the highest summits of the western Rif (e.g. Mounts: Lakraa (2159 m), Tissouka (2122 m), Taloussine (2005 m), Kelti (1926 m) and Tazaout (1791 m)).

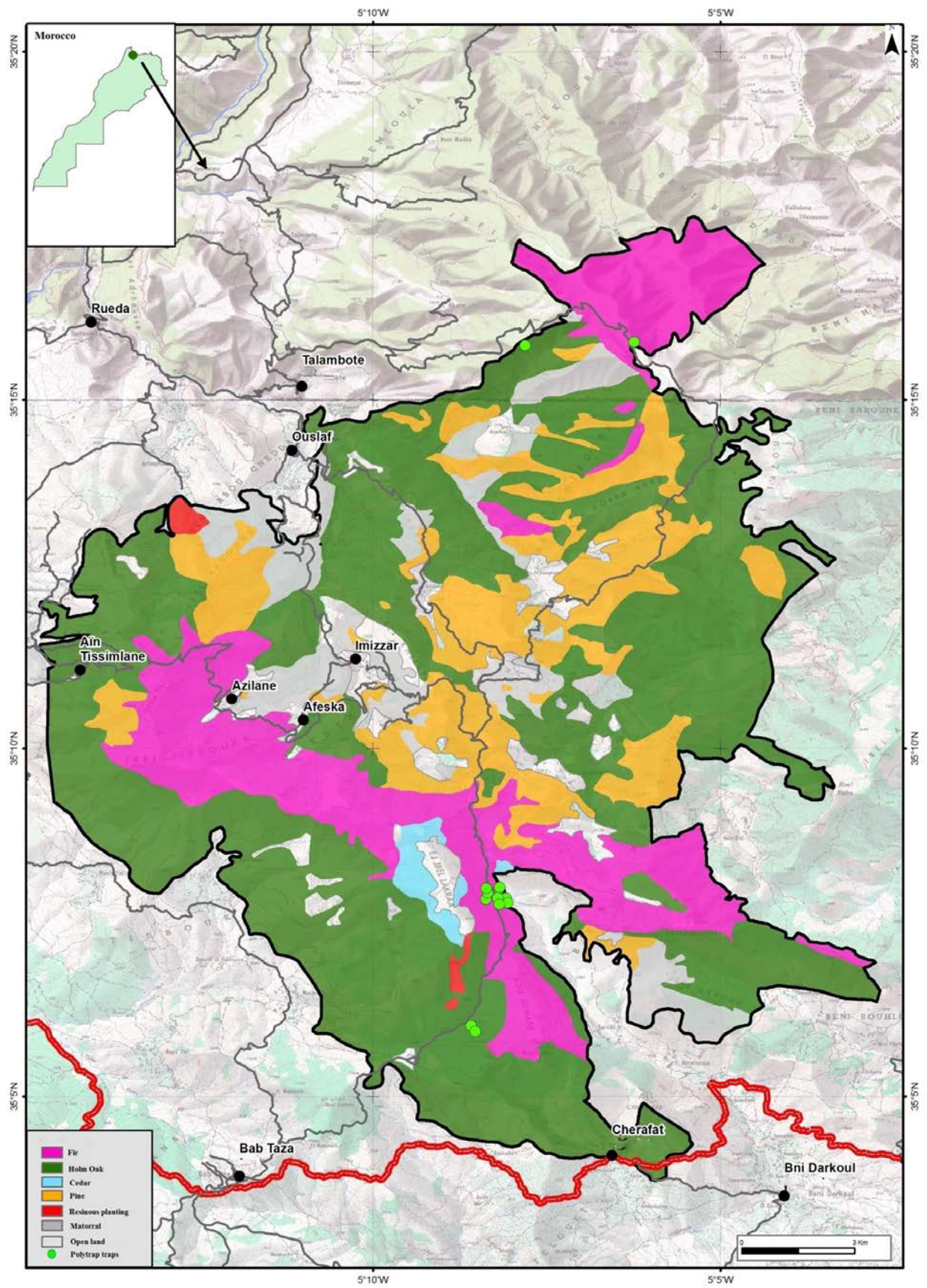
The climate of PNLTS is characterized by being the wettest zone of North Africa. The park is characterized by two climax forest stands, formed by an endemic and relict fir species, *Abies maroccana* Trab. The Talassemtane fir forest is the largest existing and extends over 2,300 ha. It is located in the province of Chefchaouen, at a distance of approximately 90 km from the Atlantic Ocean and 30 km from the Mediterranean and occupies the high summits of the Park.

The fir tree represents the main essence in this ecosystem, although it shares the territory with other species also important from an ecological point of view, the most important being black pine, maritime pine, cedar, green oak and yew. This floristic richness confers to the site a diversity of high value.

Our survey was carried out in pure fir forests (in the highest zones), as well as in fir-oak (*Quercus ilex*) forests (Fig. 1).

### Data collection

Window flight traps, and, in particular, the multidirectional Polytrap<sup>TM</sup>, were used because they are probably best suited for inventorying saproxylophagous beetles in the temperate forest (Bouget & Brustel 2009). Two other types of traps were used in the inventory: Barber traps to intercept the ground fauna and yellow colored traps to attract the flower-dwelling species (Bouget & Nageleisen 2009).



**Figure 1.** Talassemtane National Park's map showing floristic stands and Polytrap traps localization.



All traps were installed in 20 random plots in the fir grove in 2013 and 2014, and then installed in Oak Grove in 2015. The trap contents were collected once every 15 days, for 7 months (April–October), during 2013 to 2015.

Active collection was done during April 2013, August 2013, October 2013, June 2014, September 2014 and October 2015 most often during the installation of the protocol or the statements of traps. Many active methods were used such as breaking the dead or fallen trees, lifting up the stones and boulders, beating the plants and sifting the litter.

### Reference literature and treated species selection

The *Catalogue of Palaearctic Coleoptera* (Löbl & Smetana 2003, 2004, 2006, 2007, 2008, 2011, 2013) and the Commented Catalogue on beetles of Morocco “*Catalogue commenté des coléoptères du Maroc*” (Kocher 1956, 1958, 1961, 1963, 1964), were referred to designate endemic species and to establish the originality of the new data for Morocco.

Also, we used the *IUCN Red List of Threatened Species* (IUCN), the *European Red List of Saproxyllic Beetles* (Nieto & Alexander 2010), the Atlas of threatened invertebrates of Spain (Species critically endangered and endangered species) “*Atlas de los Invertebrados Amenazados de España (Especies en Peligro critico y en Pelogro)*” (Verdu and Galante 2009), the Red List of Invertebrates of Spain “*Libro Rojo de Los Invertebrados de España*” (Verdu & Galante 2006), the *Urwald relict species of Germany* (Müller et al. 2005), the *Red List of Mediterranean Saproxyllic Beetles* which is part of *IUCN Red List of Mediterranean species* (IUCM pers. com.), in order to determine the rare saproxyllic species and those threatened.

### Abbreviations

[S] Saproxyllic species, [E] endemic species, [N] new record for Morocco, [R] rare saproxyllic species. CRF: Centre de Recherche Forestière (Forest Research Centre), ED: El Hassan Dahmani, FS: Fabien Soldati, HB: Hervé Brustel, LV: Lionel Valladares, NM: Noureddin Maatouf, OC: Olivier Courtin, YB: Yousra Benyahia.

## Results

This sampling has so far identified 550 species belonging to 74 families, of which 191 are saproxyllic. Only 137 species considered as heritage species will be treated in this work, according to their status, vulnerability and rarity. Of these, 67 are endemic, 48 species new to Morocco and 20 are rare saproxyllic (Table 1).

Families are presented according the order of The *Catalogue of Palaearctic Coleoptera*.

### Carabidae

*Acinopus diana* (Shatzmayr, 1943): [E]. Jean Gourvès det.: Collected material: Fir grove, 10.IX.2013, 1 specimen, Polytrap traps, Jean Gourvès det., YB leg., 19.VI.2014, 1 specimen, FS, det. leg. Distribution: Morocco (Kataev et al. 2003), Tetouan & Rifian areas (Kocher 1963).

*Acinopus picipes* (Olivier, 1795): [N]. Bernard Junger det.: Collected material: Oak grove, 10.XI.2015, 1 specimen, HB leg. Distribution: Europe (Kataev et al. 2003).

*Laemostenus (Antisphodrus) ambroggi* (Antoine, 1961): [E]. Jean Gourvès *det.*: Collected material: Fir grove, 09.IV.2013, 1 specimen, under decaying wood, HB *leg.* 10-13.XI.2015, 5 specimens, under decaying wood and stones, HB & OC *leg.* Distribution: Morocco (Hovorka & Sciaky 2003a).

*Brachinus andalusiacus mauretanicus* (Bedel, 1914): [E]. Jean Gourvès & Bernard Junger *det.*: Collected material: From oak grove to pure fir grove, 05.VI.2014, 5 specimens, HB, OC & FS *leg.* 10-13.XI.2016, 15 specimens, HB, OC & ED *leg.* Distribution: Morocco (Hrdlicka 2003), Tangier; Ouezzane (Kocher 1963)

*Calathus semisericeus* (Fairmaire, 1879): [E]. Jean Gourvès *det.*: Collected material: Oak grove of Tazaout, 10.IV.2013, 5 specimens, FS *det.*, *leg.*, 10.IV.2013, 1 specimen, HB *leg.*, oak grove, 10.IV.2013, 1 specimen, HB *leg.*, fir grove of Tazaout, 05.VI.2014, 1 specimen, Pitfall, YB *leg.*, fir grove, 13.XI.2015, 5 specimens, HB *leg.* Distribution: Morocco (Hovorka & Sciaky 2003b); Tangier area and western Rif (Kocher 1963).

*Carabus famini favierei* (Fairmaire, 1859): [E]. Jean Gourvès *det.*: Collected material: Fir grove of Tazaout, 05.VI.2013, 1 specimen, Pitfall, YB *leg.* Oak grove of Talassemthane, 11.XI.2015, 1 specimen under stones, OC *leg.* Distribution: Morocco (Bousquet *et al.* 2003).

*Cymindis cobosi* (Mateu, 1965): [E]. Jean Gourvès *det.*: Collected material: Oak grove, 10.IV.2013, 1 specimen, HB *leg.* Distribution: Morocco (Kabak 2003).

*Eocaraterus (Baeticocarus) baeticus* (Rambur, 1837): [N]. Jean Gourvès *det.*: Collected material: Fir grove, 10.XI.2015, 3 specimens, HB *leg.* Distribution: Spain (Sierra Nevada) (Wrase 2003).

*Microlestes abeilli* (Brisout de Barneville, 1885): [N]. Jean Gourvès *det.*: Collected material: Fir grove, 04.V.2013, 10 specimens, Polytrap traps, YB *leg.* Distribution: Bosnia, France, Italy, Malta & Canary Islands (Kabak 2003).

*Orthomus tazekensis rifensis* (Wrase & Jeanne, 2005): [E]. Jean Gourvès *det.*: Collected material: Oak grove, 11.IV.2013, 4 specimens, HB *leg.* Distribution: Morocco, Rif (Wrase & Jeanne 2005).

*Paussus otini* (Antoine, 1944): [E]. HB *det.*: Collected material: Fir grove, 04.VIII.2014, 1 specimen, colored traps, YB *leg.* Fir grove, 1 specimen, 2.VII.2015, Polytrap traps, CRF *leg.* Distribution: Morocco (Nagel 2003), Southern Middle-Atlas and central High-Atlas (Kocher 1963).

## Hydrophilidae

*Cercyon obsoletus* (Gyllenhal, 1808): [N]. Pierre Queney *det.*: Collected material: Fir grove, 30.V.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: Europe, Algeria, Canary Islands, Neotropics (Hansen 2004).

## Histeridae

*Cylister filiforme* (Erichson, 1834): [S], [N]. Yves Gomy *det.*: Collected material: Fir grove, 04.V.2013, 56 specimens, Polytrap traps, 24.V.2013, 2 specimens, Polytrap traps, 04.VI.2013, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Albania, Croatia, Greece, Italy, Portugal, Spain, Algeria, Tunisia, Turkey (Mazur 2004).

*Hister illigeri* (Duftschmid, 1805): [N], Yves Gomy *det.*: Collected material: Fir grove, 19.VII.2013, 1 specimen, Polytrap traps, YB *leg.* Distribution: Europe, Asia (Mazur 2004).

*Gnathoncus nannetensis* (Marseul, 1862): [S], [N]. Yves Thieren *det.* & Yves Gomy *det.*: Collected material: Fir grove, 20.VI.2013, 1 specimen, Polytrap traps, 04.VII.2013, 2 specimens, Polytrap traps, Yves Gomy *det.*, 19.VII.2013, 1 specimen, Polytrap traps, 15.V.2014, 1 specimen, Polytrap traps, 19.VII.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Europe, Asia, Tunisia (Mazur 2004).

*Plegaderus dissectus* (Erichson, 1839): [S], [N]. Yves Thieren *det.*: Collected material: Fir grove, 16.VII.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: Europe, Iran, Turkey (Mazur 2004).

*Sternocoelis alluaudi* (Théry, 1921): [E]. Tomas Yelamos *det.*: Collected material: Fir grove, 30.VI.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: Morocco (Mazur 2004).

### Staphylinidae

*Bryaxis rifensis* (Besuchet, 1962): [E]. Collected material: Oak grove, by sifting litter, 4 specimens, 10-13 XI 2015, OC *leg.* & *det.* Distribution: Morocco (Löbl & Besuchet 2004).

*Geopselaphus depressus* (Besuchet, 1961): [E]. Collected material: Oak grove, 13.XI.2015, by sifting, 3 specimens, OC *det. leg.* Distribution: Morocco (Löbl & Besuchet 2004).

*Micropeplus staphylinoides* (Marsham, 1802): [N]. Collected material: Oak grove, 13.XI.2015, by sifting, 10 specimens, OC *det. leg.* Distribution: Europe, Algeria and Tunisia (Smetana 2004).

### Lucanidae

*Pseudolucanus barbarossa* (Fabricius, 1801): [S], [R]. Geoffrey Miessen *det.*: Collected material: Fir grove of Tazaout, 10.IV.2013, 1 specimen, NM *leg.*, Fir grove, 1 larva, 10.XI.2015 HB *leg.* Distribution: Portugal, Spain, Algeria, Morocco, Tunisia (Bartolozzi & Sprecher-Uebersax 2006).

### Scarabaeidae

*Onthophagus atricapillus* (d'Orbigny, 1908): [E]. Geoffrey Miessen *det.*: Collected material: Fir grove, 02.VII.2015, 1 specimen, CRF *leg.*, 10-13.XI.2015, 1 specimen, HB *leg.* Oak grove, 10-13.XI.2015, 1 specimen, HB *leg.* Distribution: Morocco (Löbl *et al.* 2006).

*Amphimallon amphibolum* (Peyerimhoff, 1949): [E]. Geoffrey Miessen *det.*: Collected material: Fir grove, 20.VI.2013, 1 specimen, Polytrap traps, 22.V.2014, 1 specimen, colored traps, 19.VI.2014, 1 specimen, Polytrap traps, 19.08.2014, 1 specimen, Polytrap traps; All YB *leg.* 20.VI.2014, 1 specimen, NM *leg.* Distribution: Morocco (Smetana & Kral 2006).

*Amphimallon theryi* (Peyerimhoff, 1945): [E]. Geoffrey Miessen *det.*: Collected material: Fir grove, 09.IV.2013, 1 specimen, LV *leg.* Distribution: Morocco (Smetana & Kral 2006).

*Euserica alcaidei* (Baraud, 1965): [E]. Geoffrey Miessen *det.*: Collected material: Fir grove, 04.VII.2013, 1 specimen, Polytrap traps, 31.VII.2013, 3 specimens, Polytrap traps, 15.VIII.2013, 6 specimens, Polytrap traps; All YB *leg.* Distribution: Morocco (Ahrens 2006).

*Euserica cobosi* (Baraud, 1965): [E]. Geoffrey Miessen *det.*: Collected material: Fir grove, 31.VII.2013, 1 specimen, Polytrap traps, YB *leg.* Distribution: Morocco (Ahrens 2006).

*Polyphylla fullo macrocera* (Reitter, 1891): [E]. Geoffrey Miessen *det.*: Collected material: Fir grove, 01.X.2015, 1 specimen, CRF *leg.* Distribution: Morocco (Bezdek 2006).

*Rhizotrogus alcaidei* (Baraud, 1971): [E]. Geoffrey Miessen *det.*: Collected material: Fir grove, 01.X.2015, 1 specimen, CRF *leg.* Distribution: Morocco (Smetana & Kral 2006).

### Buprestidae

*Anthaxia carmen maroccana* (Schaefer, 1937): [S], [E]. Jérôme Petitprêtre *det.*: Collected material: Fir grove, 31.VII.2013, 1 specimen, colored traps, 15.VIII.2013, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Morocco (Bílý 2006).

*Anthaxia midas oberthuri* (Schaefer, 1937): [S], [R]. Jérôme Petitprêtre *det.*: Collected material: Fir grove, 04.VI.2014, 1 specimen, Polytrap traps, 22.V.2014, 3 specimens, colored traps, HB *det.*, 4 specimens, colored traps; All YB *leg.* Distribution: France, Italy, Spain, Algeria, and Morocco (Bílý 2006).

*Anthaxia pleuralis aida* (Cobos, 1956): [S], [E]. (Fig. 2), Jérôme Petitprêtre *det.*: Collected material: Fir grove, 04.VI.2013, 1 specimen, Polytrap traps, 04.VII.2013, 2 specimens, Polytrap traps, 19.VII.2013, 2 specimens, Polytrap traps, 5 specimens, colored traps, 31.VII.2013, 2 specimens, Polytrap traps, 3 specimens, colored traps, 15.VI.2014, 2 specimens, Polytrap traps, 19.VI.2014, 1 specimen, colored traps, 30.VI.2014, 1 specimen, Polytrap traps, 04.VIII.2014, 1 specimen, colored traps; All YB *leg.*, 19.VI.2014, 1 specimen, HB *leg.* Distribution: Morocco (Bílý 2006), cited in Rif: Tiziren mountain (Kocher 1956a).

*Buprestis flavoangulata* (Fairmaire, 1856): [S], [R]. (Fig. 3), Jérôme Petitprêtre *det.*: Collected material: Fir grove, 19.VII.2013, 11 specimens, Polytrap traps, 31.VII.2013, 7 specimens, Polytrap traps, 15.VIII.2013, 1 specimen, colored traps, 16 specimens, Polytrap traps, 31.VIII.2013, 5 specimens, colored traps, 5 specimens, Polytrap traps; All YB *leg.* 19.VI.2014, 5 specimens, in lodge emerging from fir's dead wood. HB, OC, FS & LV *leg.* Distribution: Spain, Algeria, Morocco (Kubáň 2006).

### Eucnemidae

*Hylis simonae* (Olexa, 1970): [S], [N]. Tamás Németh *det.*: Collected material: Fir grove, 04.VIII.2014, 5 specimens, colored traps, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Bulgaria, France, Hungary, Spain (Muona 2007).

### Throscidae

*Aulonothroscus intactus* (Peyerimhoff, 1949): [S], [E]. Lucien Leseigneur *det.*: Collected material: Fir grove, 04.V.2013, 1 specimen, Polytrap traps, 09.V.2013, 1 specimen, Polytrap traps, 24.V.2013, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Morocco (Leseigneur 2007).

### Elateridae

*Ampedus aurilegulus* (Schaufuss, 1863): [S], [R]. Tamás Németh *det.*: Collected material: Fir grove, 20.VI.2013, 11 specimens, Polytrap traps, 04.VII.2013, 5 specimens, Polytrap traps, 19.VII.2013, 1 specimen, Polytrap traps, 31.VII.2013, 2 specimens, Polytrap traps, 22.V.2014, 2 specimens, colored traps, 2 specimens, Polytrap traps, 30.V.2014, 1 specimen, Polytrap traps, 19.VI.2014, 2 specimens, Polytrap traps, 30.VI.2014, 2 specimens, Polytrap traps, 04.VII.2014, 1 specimen, colored traps, 30.VII.2014, 1 specimen, Polytrap traps; All

YB *leg.* VII.2013, 5 specimens, 04.VI.2014, 2 specimens, 19.VI.2014, 1 specimen, NM *leg.* Distribution: France, Portugal, Spain, Algeria, Morocco, Tunisia (Cate 2007).

*Ampedus rifensis* (Platia, 2008): [S], [E]. Tamás Németh *det.*: Collected material: Fir grove, 20.VI.2013, 1 specimen, Polytrap traps, 04.VII.2013, 1 specimen, Polytrap traps, 15.VI.2014, 1 specimen, Polytrap traps, 19.VI.2014, 1 specimen, colored traps, 4 specimens, Polytrap traps, 30.VI.2014, 1 specimen, Polytrap traps, 16.VII.2014, 1 specimen, colored traps, 04.VIII.2014, 1 specimen, colored traps; All YB *leg.* Distribution: Morocco in Rif, Bab Berred (1600 m) (Platia 2008).

*Athous olceseii* (Buysson, 1905): [E]. Tamás Németh *det.*: Collected material: Fir grove of Tazaout, 05.VI.2014, 1 specimen, Pitfall traps, YB *leg.* Distribution: Morocco (Cate *in* Löbl & Smetana 2007), Tangier described on single copy and never reported since 1905 (Kocher 1956b).

*Elathous talassemtani* (Németh & Platia, 2015): [N], [E]. Collected material: Fir grove, 19.VII.2013, 1 specimen, Polytrap traps, 04.VIII.2014, 1 specimen, colored traps, 15.VIII.2014, 1 specimen, Polytrap traps, 19.VIII.2014, 1 specimen, Polytrap traps, 30.VIII.2014, 1 specimen, Polytrap traps. Distribution: Morocco (Németh *et al.* 2015).

*Harminius rifensis* (Cobos, 1969): [S], [E]. Tamás Németh *det.*: Collected material: Fir grove, 10.IX.2013, 1 specimen, Polytrap traps, YB *leg.* Distribution: Morocco (Cate 2007).

*Megathous escaleraii* (Cobos 1958): [E]. Tamás Németh *det.*: Collected material: Fir grove, 15.VIII.2013, 12 specimens, Polytrap traps, 04.VIII.2014, 1 specimen, colored traps, 1 specimen, Polytrap traps, 15.VIII.2014, 3 specimens, Polytrap traps, 30.VIII.2014, 1 specimen, Polytrap traps, 15.IX.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Morocco (Cate 2007).

## Lycidae

*Lycostomus vaucheri* (Bourgeois, 1905): [S], [R]. (Fig. 4), HB *det.*: Collected material: Fir grove, 19.VII.2013, 1 specimen, colored traps, YB *leg.* Distribution: Algeria, Morocco (Bocakova & Bocak 2007).

*Pyropterus rubripes* (Pic, 1897): [S], [R]. (Fig. 5), HB *det.*: Collected material: Fir grove, 24.V.2013, 1 specimen, Polytrap traps, 22.V.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Algeria (Bocakova & Bocak 2007), Morocco named *Dyctiopterus rubripes* (Pic), central Middle Atlas (1500m), Ifrane, Azrou (Kocher 1956b).

## Lampyridae

*Nyctophila confusa confusa* (Geisthardt, 1982): [E]. HB *det.*: Collected material: Fir grove, 19.VII.2013, 2 specimens, Polytrap traps, 19.VIII.2014, 3 specimens, Colored traps; All YB *leg.* Distribution: Morocco (Geisthardt & Satô 2007).

## Cantharidae

*Malthinus intermedius* (Wittmer, 1971): [E]. Robert Constantin *det.*: Collected material: Fir grove, 04.VI.2014, 2 specimens, colored traps, 15.VI.2014, 4 specimens, colored traps, 19.VI.2014, 12 specimens, colored traps, 2 specimens, Polytrap traps, 30.VI. 2014, 1 specimen, Polytrap traps, 04.VII.2013, 6 specimens, colored traps, 16.VII.2014, 3 specimens, colored traps, 04.VIII.2014, 1 specimen, colored traps; All YB *leg.*, 19.VI.2014, 3 specimens,



OC leg., 20.VI.2014, oak grove, 4 specimens, HB leg. Distribution: Morocco (Kazantsev & Brancucci 2007).

*Malthinus otini* (Wittmer, 1971): [E]. Robert Constantin det.: Collected material: Fir grove, 30.VII.2014, 1 specimen, Polytrap traps, YB leg. Distribution: Morocco (Kazantsev & Brancucci 2007).

*Malthinus vaucheri* (Pic, 1901): [E]. Robert Constantin det.: Collected material: Fir grove, 19.VI.2014, 4 specimens, colored traps, 30.VI.2014, 1 specimen, Polytrap traps, 04.VII.2014, 1 specimen, Polytrap traps; All YB leg. Distribution: Morocco (Kazantsev & Brancucci 2007).

*Rhagonycha cf. fulvonigra* (Dahlgren, 1972): [E]. Robert Constantin det.: Collected material: Fir grove, 15.V.2014, 5 specimens, Polytrap traps, 19.VI.2014, 1 specimen, colored traps, All YB leg. Distribution: Morocco (Kazantsev & Brancucci 2007).

*Rhagonycha quadricollis* (Kiesenwetter, 1852): [N]. Robert Constantin det.: Collected material: Fir grove, 04.VI.2013, 2 specimens, Polytrap traps, YB leg. Distribution: Algeria, Tunisia, Portugal, Spain (Kazantsev & Brancucci 2007).

*Rhagonycha tangeriana* (Pic, 1903): [E]. Robert Constantin det.: Collected material: Fir grove, 04.VI.2014, 1 specimen, Colored traps, 19.VI.2014, 2 specimens, colored traps, 30.VI.2014, 1 specimen, Polytrap traps; All YB leg. Distribution: Morocco (Kazantsev & Brancucci 2007); Tangier, Taza (Bab bou-Idir) (Kocher 1956a).

### Dermestidae

*Dermestes gyllenhali gyllenhali* (Castelnau, 1840): [N]. Marcin Kadej det.: Collected material -Fir grove, 31.VIII.2013, 1 specimen, YB leg. Distribution: Europe, Asia (Háva 2007).

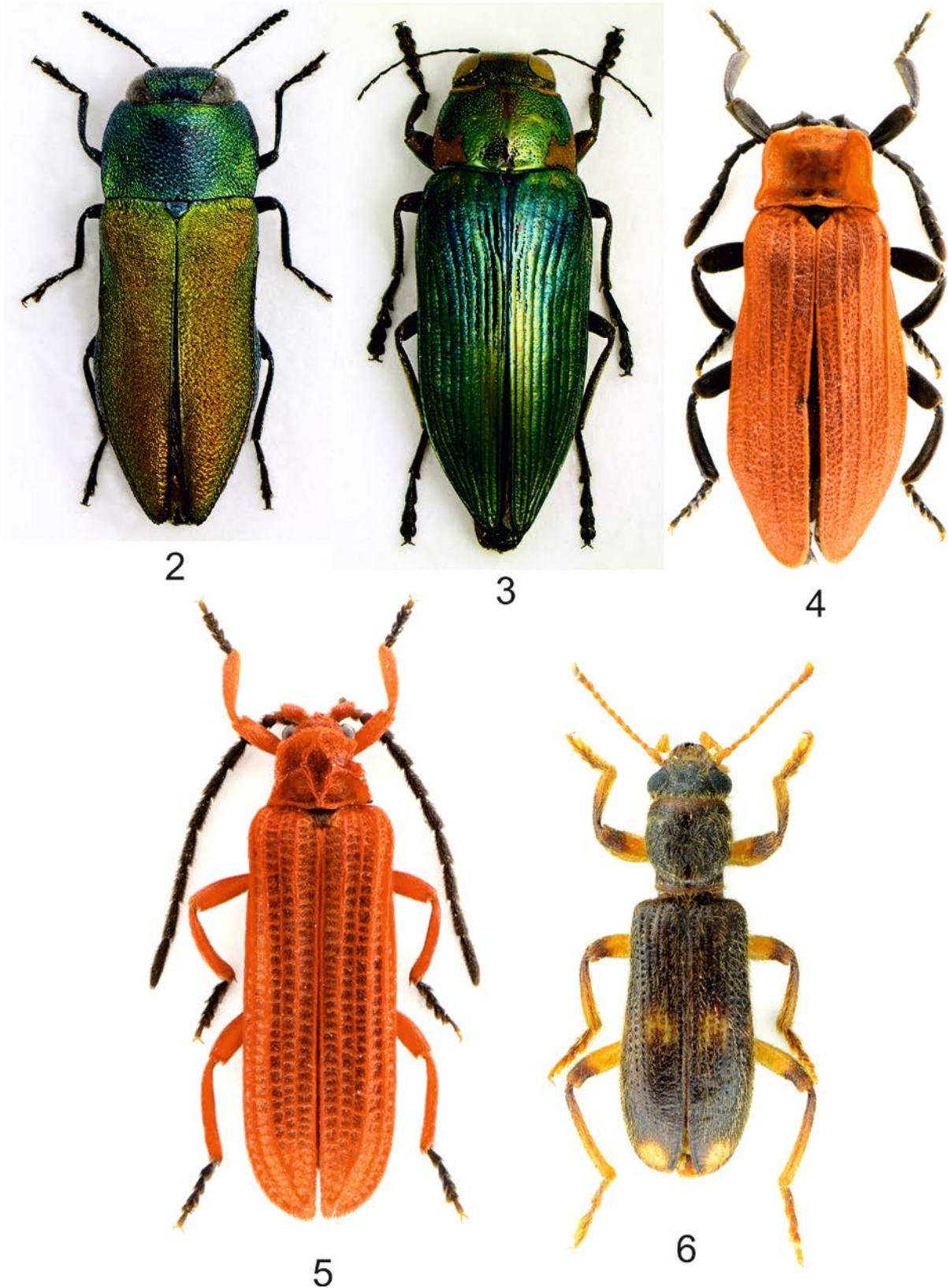
*Globicornis sp. nov.* (submitted to journal by Kadej, Háva & Herrmann in 2016): [N], [E]. Collected material: Fir grove, 04.VII.2013, 1 specimen, Polytrap traps, 15.V.2014, 1 specimen, Polytrap traps, 04.VI.2014, 1 specimen, Polytrap traps, 15.VI.2014, 5specimens, Polytrap traps, 19.VI.2014, 11 specimens, Polytrap traps, 30.VI.2014, 1 specimen, Polytrap traps.

### Ptinidae

*Ptinus aubei* (Boieldieu, 1854): [N]. Benjamin Calmont det.: Collected material: Fir grove, 04.V.2013, 1 specimen, Polytrap traps, YB leg. Distribution: Croatia, Spain, France, Italy, Slovenia, Algeria, Tunisia (Borowski 2007).

### Trogossitidae

*Temnochila caerulea* (Olivier, 1790): [S], [R]. HB det.: Collected material: Fir grove, 04.V.2013, 1 specimen, Polytrap traps, 15.V.2014, 1 specimen, Polytrap traps; All YB leg., 20.VI.2014, 2 specimens, OC det. leg., NM leg. Distribution: Europe, Algeria, Canary Islands, Tunisia, Cyprus (Kolibac 2007).



**Figure 2-6.** Habitus of beetles. **2**, *Anthaxia pleuralis aida* Cobos, 1956 ♀ (photo Jérôme Petitprêtre); **3**, *Buprestis flavoangulata* Fairmaire 1856 ♂ (photo Jérôme Petitprêtre); **4**, *Lycostomus vaucheri* Bourgeois, 1905 (photo Pierre Zagatti); **5**, *Pyropterus rubripes* Pic, 1897 (photo Pierre Zagatti); **6**, *Opilo barbarus* Abeille de Perrin, 1893 (photo Pierre Zagatti).

**Cleridae**

*Opilo barbarus* (Abeille de Perrin, 1893): [S], [R]. (Fig. 6), HB *det.*: Collected material: Fir grove, 15.VIII.2013, 1 specimen, Polytrap traps, 26.IX.2013, 1 specimen, Polytrap traps, 30.VII.2014, 1 specimen, Polytrap traps, 04.VIII.2014, 3 specimens, colored traps, 15.VIII.2014, 1 specimen, Polytrap traps, 19.VIII.2014, 1 specimen, Polytrap traps, 30.VIII.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Algeria, Morocco, Egypt, Tunisia (Löbl *et al.* 2007).

*Trichodes moghrebicus* (Lesne, 1925): [E]. HB *det.*: Collected material: Fir grove, 16.VII.2014, 1 specimen, colored traps, 04.VIII.2014, 2 specimens, colored traps, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Morocco (Middle Atlas) (Löbl *et al.* 2007).

*Korynetes geniculatus* (Klug, 1842): [S], [R]. Collected material: Oak grove, 10.IV.2013, 1 specimen, by sifting, HB *det. leg.* Distribution: Algeria, Spain, France, Portugal, Morocco and Tunisia (Löbl *et al.* 2007).

**Dasytidae**

*Aplocnemus andalusicus* (Rosenhauer, 1856): [S], [N]. Robert Constantin *det.*: Collected material: Fir grove, 16.VII.2014, 2 specimens, colored traps, 30.VII.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Spain, Portugal (Mayor 2007a).

*Aplocnemus montivagus* (Rosenhauer, 1856): [S], [N]. Robert Constantin *det.*: Collected material: Fir grove, 15.V.2014, 11 specimens, Polytrap traps, 22.V.2014, 4 specimens, Colored traps, 22.V.2014, 5 specimens, Polytrap traps, 30.V.2014, 1 specimen, Polytrap traps, 04.VI.2014, 1 specimen, Polytrap traps, 04.VI.2014, 1 specimen, colored traps, 15.VI.2014, 22 specimens, Polytrap traps, 19.VI.2014, 6 specimens, colored traps, 19.VI.2014, 8 specimens, Polytrap traps, 30.VI.2014, 5 specimens, Polytrap traps, 04.VII.2014, 1 specimen, colored traps, 15.VII.2014, 1 specimen, Polytrap traps, 19.VIII.2014, 1 specimen, colored traps; All YB *leg.* Distribution: Spain (Mayor 2007a).

*Dasytes setosus* (Waltl, 1835): [S], [N]. Robert Constantin *det.*: Collected material: Fir grove, 19.VII.2013, 2 specimens, Polytrap traps, 31.VII.2013, 4 specimens, Polytrap traps; All YB *leg.* Distribution: Spain (Mayor 2007a).

*Dasytidius pardoii* (Majer, 1990): [E]. Robert Constantin *det.*: Collected material: Fir grove, 04.VI.2014, 2 specimens, colored traps, 15.VII.2014, 1 specimen, Polytrap traps, 16.VII.2014, 1 specimen, colored traps, 04.VIII.2014, 3 specimens, Polytrap traps, 15.VIII.2014, 3 specimens, Polytrap traps, 19.08.2014, 1 specimen, Colored traps; All YB *leg.* Distribution: Morocco (Mayor 2007a).

*Mauroania longula* (Desbrochers, 1889): [N]. Robert Constantin *det.*: Collected material: Fir grove, 04.VI. 2014, 1 specimen, Colored traps, 15.VI.2014, 1 specimen, Polytrap traps, 19.VI.2014, 2 specimens, colored traps, 04.VII.2014, 1 specimen, colored traps, 19.IX.2014, 1 specimen, Polytrap traps, 15.X.2014, 1 specimen, Polytrap traps, 18.X.2014, 1 specimen, colored traps, 18.X.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Spain, Algeria, Tunisia (Mayor 2007a).

**Malachiidae**

*Attalus iguermalensis* (Escalera, 1936): [E]. Robert Constantin *det.*: Collected material: Fir grove, 15.V.2014, 2 specimens, Polytrap traps, 22.V.2014, 1 specimen, colored traps,

04.VI.2014, 2 specimens, colored traps, 15.VI.2014, 2 specimen, Polytrap traps; All YB *leg.* Distribution: Morocco (Mayor 2007b); central Rif: Igoumalen, South West Al-Hoceima (Kocher 1956a).

*Axinotarsus robustus* (Pic, 1905): [E]. Robert Constantin *det.*: Collected material: Fir grove, 15.VII.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: Morocco (Mayor 2007a); North West Morocco, between Tangier and Issaguen, central Rif and Middle Atlas, reaching 1800 m (Kocher 1956a).

### Nitidulidae

*Pityophagus laevior* (Abeille de Perrin, 1872): [S], [N]. HB & Paolo Audisio *det.*: Collected material: Fir grove, 09.IV.2013, 21 specimens, Polytrap traps, 04.V.2013, 1 specimen, Polytrap traps, 09.V.2013, 7 specimens, Polytrap traps, 24.V.2013, 12 specimens, Polytrap traps, 30.IV.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Europe, Mauritania (Jelínek & Audisio 2007).

This species has been cited from Morocco by Kocher (1956b) in the Middle Atlas and Rif, while Audisio (1993) mentioned that it was actually *P. ferrugineus* (Linnaeus 1761), whence its omission in the Catalogue of Palearctic Coleoptera (2007). Both species have been found in this project (P. Audisio *det.*).

### Monotomidae

*Rhizophagus ferrugineus* (Paykull, 1800): [S], [N]. Thomas Barnouin *det.*: Collected material: Fir grove, 09.V.2013, 1 specimen, Polytrap traps, YB *leg.* Distribution: Europe, Algeria, Canary Islands, Mongolia (Jelínek 2007).

### Laemophloeidae

*Notolaemus castaneus* (Erichson, 1845): [S], [N]. HB *det.*: Collected material: Fir grove, 04.VI.2013, 4 specimens, Polytrap traps, 19.VI.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Europe (Wegrzynowicz 2007b).

### Cryptophagidae

*Atomaria nigripennis* (Kugelann, 1794): [N]. J-C Otero *det.*: Collected material: Fir grove, 10-13.XI.2015, 9 specimens, HB *leg.* Distribution: Europe, Tunisia (Johnson *et al.* 2007).

*Caenoscelis mussardi* (C. Johnson & Bowstead, 2003): [E]. Collected material: Oak grove, 13.XI.2015, 3specimen, by sifting, OC *det. leg.* Distribution: Morocco (Johnson *et al.* 2007).

*Cryptophagus cylindrellus* (Johnson, 2007): [N]. J-C Otero *det.*: Collected material: Fir grove, 22.V.2014, 1 specimen, Colored traps, 15.VI.2014, 1 specimen, Polytrap traps, 19.VI.2014, 2 specimens, Polytrap traps, 03.X.2014, 2 specimens, Polytrap traps, 1 specimen, Colored traps; All YB *leg.* Distribution: Europe, Turkey (Johnson *et al.* 2007).

*Cryptophagus jakowlewi* (Reitter, 1888): [N]. J-C Otero *det.*: Collected material: Fir grove, 04.V.2013, 7 specimens, Polytrap traps, 09.V.2013, 3 specimens, Polytrap traps, 2 specimens, pitfall, 26.IX.2013, 1 specimen, colored traps, 30.IV.2014, 1 specimen, Polytrap traps, 15.VI.2014, 2 specimens, Polytrap traps, 19.VI.2014, 26 specimens, Polytrap traps, 15.X.2014, 1 specimen, Polytrap traps, 18.X.2014, 1 specimen, colored traps, 31.X.2014, 5 specimens, Polytrap traps; All YB *leg.* Distribution: Europe, Asia (Johnson *et al.* 2007).



*Cryptophagus pallidus* (Sturm, 1845): [N]. J-C Otero *det.*: Collected material: Fir grove, 10/13.XI.2015, 3 specimens, HB *det.* Distribution: Europe, Asia, Algeria, Libya, Tunisia (Johnson *et al.* 2007).

*Cryptophagus turcicus* (Gillerfors & Otero, 1993): [N]. J-C Otero *det.*: Collected material: Fir grove, 30.IV.2014, 2 specimens, Polytrap traps, YB *leg.* Distribution: India (Kashmir), Kyrgyzstan, Russia (Caucasus), Turkey (Johnson *et al.* 2007).

*Cryptophagus spadiceus* (Falcoz, 1925): [N]. Collected material: Oak grove, 13.XI.2015, by sifting, 1 specimen, OC *det. leg.* Distribution: Spain (Johnson *et al.* 2007).

### Erotylidae

*Triplax lacordairei* (Crotch, 1870): [S], [R]. HB *det.*: Collected material: Fir grove, 20.VI.2013, 4 specimens, Polytrap traps, 04.VII.2013, 2 specimen, Polytrap traps, 19.VII.2013, 1 specimen, Polytrap traps, 30.IV.2014, 1 specimen, Polytrap traps, 15.V.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Europe, Algeria, Morocco (Wegrzynowicz 2007a); northern Morocco: Tangier, Beni-Msouar, Middle-Atlas (Kocher 1956b).

*Triplax bedeli* (Reitter, 1888): [S], [E]. Collected material: Oak grove, 10.IV.2013, 1 specimen, by sifting, HB *det. leg.* Distribution: Morocco (Wegrzynowicz 2007a).

### Bothrideridae

*Bothrideres interstitialis* (Hayeden, 1870): [S], [R]. HB *det.*: Collected material: Fir grove, 10.IV.2013, 1 specimen, 20.VI.2014, 4 specimens, HB *leg.* Distribution: France, Spain, Algeria, Morocco (Ślipiński 2007a). This is the first record in PNTLS elsewhere in Morocco, it has been reported from Rif in Larache (Northern city), Beni Mesouar, Isaguen, Middle and High-Atlas (towards 2300 m) (Kocher 1956b).

### Cerylonidae

*Philothermus semistriatus* (Perris, 1856): [S], [R]. HB *det.*: Collected material: Fir grove, 19.VII.2013, 2 specimens, Polytrap traps, 15.VII.2014, 1 specimen, Polytrap traps; All YB *leg.* 11.XI.2015, 1 specimen, by sifting fir litter, OC *leg. det.* Distribution: Europe, Algeria, Morocco (Ślipiński 2007b).

### Alexiidae

*Sphaerosoma tingitanum* (Peyerimhoff, 1917): [E]. OC *det.*: Collected material: Oak grove, 13.XI.2015, by sifting, 17 specimens, HB & OC *leg.* Distribution: Morocco (Tomaszewska 2007).

### Coccinellidae

*Lithophilus rifensis* (Iablokoff-Khnzorian, 1974): [E]. J-P Coutanceau *det.*: Collected material: Oak grove, 20.VI.2014, 1 specimen, HB *leg.* Distribution: Morocco (Kovar 2007).

*Nephus bipunctatus* (Kugelann, 1794): [N]. J-P Coutanceau *det.*: Collected material: Fir grove, 04.V.2013, 2 specimens, Polytrap traps, 20.VI.2013, 1 specimen, Polytrap traps,

15.V.2014, 3 specimens, Polytrap traps, 19.VI.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Europe, Asia (Kovar 2007).

*Nephus quadrimaculatus* (Herbst, 1783): [N]. J-P Coutanceau *det.*: Collected material: Fir grove, 04.V.2013, 3 specimens, Polytrap traps, 04.VIII.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Europe, Asia (Kovar 2007).

*Novius cruentatus* (Mulsant, 1850): [N]. J-P Coutanceau *det.*: Collected material: Fir grove, 04.V.2013, 2 specimens, Polytrap traps, 09.V.2013, 1 specimen, Polytrap traps, 24.V.2013, 1 specimen, Polytrap traps, 04.VI.2013, 1 specimen, Polytrap traps, 04.VII.2013, 2 specimens, Polytrap traps, 19.VII.2013, 9 specimens, Polytrap traps, 31.VII.2013, 1 specimen, Polytrap traps; All YB *leg.* 10-13.XI.2015, 2 specimens, HB *leg.* Oak grove, 15.VIII.2015, 3 specimens, Polytrap traps, 1 specimen, colored traps, 30.VIII.2015, 7 specimens, Polytrap traps, 1 specimen, colored traps, 30.IX.2015, 1 specimen, Polytrap traps, 15.X.2015, 1 specimen, Polytrap traps; All CRF *leg.* 11.XI.2015, 1 specimen, OC *leg.* Distribution: Europe, Algeria, Turkey (Kovar 2007).

*Oenopia conglobata* (Linnaeus, 1758): [N]. J-P Coutanceau *det.*: Collected material: Oak grove, 10-13.XI.2015, 1 specimen, HB *leg.* Distribution: Europe, Asia (Kovar 2007).

*Scymnus mimulus* (Fürsch, 1958): [N]. J-P Coutanceau *det.*: Collected material: Fir grove, 30.IV.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: Europe, Asia (Kovar 2007).

### Latridiidae

*Dienerella* sp. nov., (submitted to journal by Otero *et al.* in 2016): [E], [N]. J-C Otero *det.*: Collected material: Oak grove, 13.XI.2015, by sifting, 1 specimen, OC *det. leg.*: Fir grove Talassemtane, 10/13.XI.2015, 2 specimens, HB *leg.* Distribution: Morocco (Johnson 2007).

### Mycetophagidae

*Esarcus* cf. *letourneuxi* (Raffray, 1873): [S], [N]. OC & HB *det. leg.*: Collected material: Oak grove, 20.06.2014, 3 specimens, by sifting; 10 au 13.XI.2015, 12 specimens. Distribution: Algeria (Nikitsky 2008a).

### Ciidae

*Cis corioli* (Peyerimhoff, 1915): [S], [N]. Olivier Rose *det.*: Collected material: Fir grove, 19.VII.2013, 1 specimen, Polytrap traps, YB *leg.* Distribution: Algeria (Jelínek 2008).

### Tetratomidae

*Tetratoma baudueri* (Perris, 1864): [S], [R]. HB *det.*: Collected material: Fir grove, 15.X.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: France, Spain, Portugal, Morocco (Nikitsky 2008b).

### Melandryidae

*Marolia grandis* (Peyerimhoff, 1917): [S], [N]. HB *det.*: Collected material: Fir grove, 09.V.2013, 1 specimen, Polytrap traps, 04.VI.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Algeria (Nikitsky & Pollock 2008).

*Orchesia micans* (Panzer, 1793): [S], [N]. HB *det.*: Collected material: Fir grove, 15.X.2014, 1 specimen, Polytrap traps, 18.X.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Europe, Algeria, Tunisia, Russia (West Siberia) (Nikitsky & Pollock 2008).

*Ruschia parreyssi* (Mulsant, 1856): [S], [N]. Ondřej Konvička *det.*: Collected material: Fir grove, 04.VI.2013, 1 specimen, Polytrap traps, 20.VI.2013, 3 specimens, Polytrap traps, 04.VII.2013, 14 specimens, Polytrap traps, 19.VII.2013, 7 specimens, colored traps, 13 specimens, Polytrap traps, 31.VII.2013, 2 specimens, Polytrap traps, 22.V.2014, 1 specimen, Polytrap traps, 5.VI.2014, 2 specimens, Polytrap traps, 30.VI.2014, 1 specimen, Polytrap traps, 04.VII.2014, 3 specimens, colored traps, 4 specimens, Polytrap traps, 04.VIII.2014, 2 specimens, Polytrap traps, 30.VIII.2014, 1 specimen, Polytrap traps; All YB *leg.*, 19.VI.2014, 2 specimens, HB *leg.* Distribution: Europe, Cyprus, Turkey (Nikitsky & Pollock 2008).

### Zopheridae

*Synchita undata* (Guérin-Méneville, 1844): [S], [N]. HB *det.*: Collected material: Fir grove, 16.VII.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: Europe (Ślipiński & Schuh 2008).

### Tenebrionidae

*Alphasida (Machlasida) kraatzi parallelissima* (Escalera, 1927): [E]. FS *det.*: Collected material: Oak grove - Fir grove, 20.VI.2014, 1 specimen, OC *leg.* Distribution: Morocco, Rif in Chefchaouen (Perez & Avila 2012).

*Asida (Planasida) septemsis* (Vera, Ruiz & Avila, 2012): [E]. FS *det.*: Collected material: Fir grove, 05.VI.2014, 1 specimen, NM *leg.* Distribution: Morocco, Beni Msuar in South-East of Tangier (Perez *et al.* 2012).

*Clamoris crenatus* (Mulsant, 1854): [S][R]. FS *det.*: Collected material: Fir grove, 31.VII.2013, 1 specimen, Polytrap traps, 15.VIII.2013, 8 specimens, Polytrap traps, 15.VIII.2014, 2 specimens, 30.VIII.2014, 1 specimen, Polytrap traps; YB *leg.* 7 specimens, fir grove in a decay of fir tree, 11.XI.2015 HB *leg.* Distribution: Iberian Peninsula, France, Italy, Malta, Algeria and Tunisia (Löbl *et al.* 2008), Corsica (Dodelin 2012), Morocco (Benyahia *et al.* 2015).

*Dendarus insidiosus riffensis* (Escalera, 1944): [E]. FS *det.*: Collected material: Oak - Fir grove, 20.VI.2014, 2 specimens under stones, FS *det. leg.* OC *leg.* Fir grove of Tazaout, 10.IV.2013, 1 specimen, FS *det.*, HB *leg.* Distribution: Morocco, Western Rif (Kocher 1958b).

*Gonocephalum granulatum* (Fabricius, 1792): [E]. FS *det.*: Collected material: Oak grove, 20.VI.2014, 13 specimens, FS *leg.* Fir grove, 19.VI.2014, 2 specimens, OC *leg.* Distribution: Morocco (Iwan *et al.* 2010).

*Heliopates rectangularis* (Antoine, 1951): [E]. FS *det.*: Collected material: Fir grove, 20.VI.2013, 1 specimen, Polytrap traps, YB *leg.*, 19-20.VI.2014, 11 specimens, FS, NM, OC & YB *leg.* Distribution: Morocco, Western Rif (Kocher 1958b).

*Helops insignis maroccanus* (Fairmaire, 1873): [S], [E]. FS *det.*: Collected material: Fir grove, 20.VI.2014, 9 specimens, OC & NM *leg.* Distribution: Morocco (Nabozhenko & Löbl 2008); Tangier area, Rif and Middle-Atlas (Kocher 1958b).

*Hymenophorus candeli* (Pardo-Alcaide, 1978): [S], [E]. FS *det.*: Collected material: Fir grove, 31.VII.2013, 1 specimen, Polytrap traps, 30.VII.2014, 1 specimen, Polytrap traps, 04.VIII.2014, 2 specimens, Polytrap traps; All YB *leg.* Distribution: Morocco, central Rif (Pardo-Alcaide 1978).

*Lagria theryi* (Pic, 1938): [E]. FS *det.*: Collected material: Fir grove, 04.VI.2014, 1 specimen, NM *leg.* 19.VI.2014, 1 specimen, colored traps, YB *leg.* 20.VI.2014, 11 specimens, FS, HB & OC *leg.* Distribution: Morocco (Merkl 2008), Middle Atlas and High Atlas (Kocher 1956c).

*Misolampus goudotii* (Guérin-Méneville, 1834): [S], [E]. FS *det.*: Collected material: Oak grove, 19.VI.2014, 2 specimens, OC *leg.* Fir grove, 10.IV.2013, 7 specimens, LV *leg.*, 31.VIII.2013, 1 specimen, YB *leg.*, 31.X.2013, 1 specimen, YB *leg.*, 04.VI.2014, 2 specimens, NM *leg.*, 19.VI.2014, 4 specimens, OC *leg.* Distribution: Morocco (Löbl *et al.* 2008), Tangier areas and Rif (Kocher 1958b).

*Mycetochara cf. maura* (Fabricius, 1792): [S], [R]. “species probably new to science”: Collected material: Fir grove, 19.VI.2014, 3 specimens, Polytrap traps, FS *det.*, YB *leg.*, 04.VII.2014, Polytrap traps, 1 specimen, HB *det. leg.* Distribution: Europe, Morocco, Turkey (Novak & Pettersson 2008).

*Nalassus (Helopocerodes) marteni* (Español, 1953): [S], [E]. FS *det.*: Collected material: Fir grove, 19.VII.2013, 2 specimens, Polytrap traps, YB *leg.*, 15.V.2014, 1 specimen, Polytrap traps, YB *leg.*, 19.VI.2014, 1 specimen, HB *leg.* Fir grove of Tazaout, 10.IV.2013, 3 specimens, HB & LV *leg.* Distribution: Morocco (Nabozhenko & Löbl 2008) and micro-endemic to Western Rif (Kocher 1958b).

*Opatrum (Colpophorus) rifense* (Kocher, 1945): [E]. FS *det.*: Collected material: Fir grove, 20.VI.2014, 35 specimens, OC, NM, HB & YB *leg.* Fir grove of Tazaout, 10.IV.2013, LV *leg.* Distribution: Morocco, Rif (Kocher 1958b).

*Pachychila forticornis* (Escalera, 1923): [E]. FS *det.*: Collected material: Fir grove, 05.VI.2014, 2 specimens, NM *leg.*, 20.VI.2014, 3 specimens, FS *leg.* Distribution: Morocco, Rif (Löbl *et al.* 2008).

*Pachychila salzmanni jordanai* (Escalera, 1925): [E]. FS *det.*: Collected material: Oak grove, 20.VI.2014, 1 specimen, FS *leg.* Distribution: Morocco, Rif (Löbl *et al.* 2008).

*Pentaphyllus chrysomeloides* (Rossi, 1792): [S][R]. FS *det.*: Collected material: Fir grove, 30.IX.2014, 3 specimens, NM *leg.* Distribution: Europe, Middle East, Asia, Tunisia (Löbl *et al.* 2008), Morocco (Benyahia *et al.* 2015).

*Pimelia atlantis* (Solier, 1836): [E]. FS *det.*: Collected material: Fir grove, 05.VI.2014, 2 specimens, NM *leg.* 20.VI.2014, 2 specimens, FS & OC *leg.* Fir grove of Tazaout, 10.IV.2013, 2 specimens, HB & LV *leg.* Distribution: Morocco, Rif and Middle-Atlas (Kocher 1958b).

*Stenosis lafanecherei* (Antoine, 1951): [E]. FS *det.*: Collected material: Oak grove - Fir grove, 20.VI.2014, 4 specimens, FS & OC *leg.* Fir grove, 24.V.2013, 1 specimen, Polytrap traps, 04.VI.2013, 1 specimen, pitfall; All YB *leg.*, 19-20.VI.2014, 8 specimens, FS, HB & NM *leg.* Distribution: Morocco, Rif (Löbl *et al.* 2008).

Thirty-five species belonging to 8 subfamilies of darkling beetles has been recently the subject of a scientific paper (Benyahia *et al.* 2015), which describe the diversity of darkling beetles in the PNTLS and highlighting endemic species, rediscovered ones and new additions to Moroccan coleoptera diversity.



**Prostomidae**

*Prostomis cf. mandibularis* (Fabricius, 1801): [S], [R]. Collected material: Fir grove, 19.VII.2013, 4 specimens, YB leg., 20.VI.2014, 1 specimen, HB det. NM leg. 10-13.XI.2015, 20 specimens, HB, OC, NM & ED leg. Distribution: Europe, Iran, Turkey (Schawaller 2008); Morocco: cedar forest of Middle Atlas (1600-2000 m), Ain Kahla; Ifrane (Kocher 1956b).

**Salpingidae**

*Cariderus aeneus* (Olivier, 1807): [S], [N]. HB det.: Collected material: Fir grove, 09.IV.2013, 3 specimens, Polytrap traps, 15.X.2014, 1 specimen, Polytrap traps; All YB leg. Distribution: Europe, Algeria (Pollock & Löbl 2008).

**Aderidae**

*Anidorus sanguinolentus* (Kiesenwetter, 1861): [S], [N]. HB det.: Collected material: Fir grove, 04.VI.2013, 1 specimen, Pitfall traps, YB leg. Distribution: Bosnia, Spain, France, Italy, Portugal, Algeria, Syria (Nardi 2008).

**Scraptiidae**

*Anaspis maroccana* (Fleicher, 1909): [S], [E]. Pascal Leblanc det.: Collected material: Fir grove, 04.VII.2013, 7 specimens, Polytrap traps, 19.VII.2013, 2 specimens, Polytrap traps, 1 specimen, colored traps, 31.VII.2013, 1 specimen, Polytrap traps, 15.VI.2014, 3 specimens, Polytrap traps, 30.VI.2014, 1 specimen, Polytrap traps, 04.VII.2014, 3 specimens, colored traps, 15.X.2014, 2 specimens, Polytrap traps; All YB leg. Distribution: Morocco (Leblanc et al. 2008).

**Cerambycidae**

*Clorophorus favieri* (Fairmaire, 173): [S], [E]. HB det.: Collected material: Fir grove, 19.VII.2013, 2 specimens, Polytrap traps, YB leg. Distribution: Morocco (Sama 2010a); Tangier (Jbel kebir), Larache, Oulmès (Kocher 1958d).

*Ergates faber opifex* (Mulsant, 1851): [S], [R]. HB det.: Collected material: Fir grove, 20.VI.2014, 1 specimen, NM leg. 10 specimens, obtained from rearing larva in 2014 and 2015, HB leg. Distribution: Italy (Calabria and Sicily), Algeria (Drumont & Komiya 2010); Morocco in eastern Middle Atlas (Bab bou-idir, Tazekka and Midelt) (Kocher 1958d).

*Nathrius berlandi* (Villers, 1946): [S], [E]. HB det.: Collected material: Fir grove, 19.VII.2013, 1 specimen, colored traps, 15.VII.2014, 1 specimen, Polytrap traps, 16.VII.2014, 1 specimen, colored traps, 1 specimen, Polytrap traps, 30.VII.2014, 1 specimen, Polytrap traps, 04.VIII.2014, 23 specimens, colored traps, 1 specimen, Polytrap traps, 15.VIII.2014, 35 specimens, Polytrap traps, 19.VIII.2014, 3 specimens, colored traps, 30.VIII.2014, 2 specimens, Polytrap traps; All YB leg. Distribution: Morocco (Sama 2010a).

*Pogonocherus pesarinii* (Sama, 1993): [S], [E]. Collected material: Fir grove, 19.VI.2014, 2 specimens, HB det. leg. Distribution: Morocco (Sama 2010b).

*Rhagium inquisitor cedri* (Reymond, 1953): [S], [R]. HB det.: Collected material: Fir grove, 24.V.2013, 2 specimens, Polytrap traps, 20.VI.2013, 1 specimen, Polytrap traps, 22.V.2014, 1 specimen, colored traps; All YB leg. Distribution: Spain, Morocco (Sama 2010c); Rifian areas, Middle Atlas (Kocher 1958d).

*Semanotus laurasii laurasii* (Lucas, 1852): [S], [R]. Collected material: Fir grove, 04.VI.2013, 1 specimen, pitfall, HB *det. leg.* Distribution: France, Spain, Algeria, Morocco (Sama 2010a).

*Stictoleptura tangeriana* (Tournier, 1875): [S], [E]. OC & HB *det.*: Collected material: Fir grove, 20.VI.2014, 1 specimen, in a decaying cavity of fir tree, OC *leg.*, 4 specimens, rearing larva from the same fir tree, HB et OC *leg.* Distribution: Morocco (Sama 2010c).

### Chrysomelidae (Bruchinae)

*Bruchus venustus* (Fåhraeus, 1839): [N]. OC *det.*: Collected material: Fir grove, 19.VII.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: Europe, Turkey (Anton 2010).

### Curculionidae

*Acalles parasierrae* (Stüben, 2002): [E]. Collected material: Oak grove, 20.VI.2014, by sifting, 1 specimen, P.E. Stüben *det.*, HB *leg.*, 2 specimens, OC *leg. det.*; 10-13.XI.2015, 4 specimens, OC *det. leg.* Fir grove, 10-13.XI.2015, 6 specimens, HB *det. leg.* Distribution: Morocco (Stüben & Alonso-Zarazaga 2013).

*Aspidapion soror* (Rey, 1895): [N]. Collected material: Fir grove, 20.VII.2013, 1 specimen, Polytrap traps, Gabriel Alziar *det.*, 24.VII.2013, 1 specimen, Polytrap traps, Jean Pelletier *det.*, 15.IX.2014, 1 specimen, Polytrap traps, Jean Pelletier *det.*; All YB *leg.* Distribution: Europe, Algeria, Tunisia, Turkey (Alonso-Zarazaga 2011).

*Caenopsis peyerimhoffi* (Hustache, 1935): [E]. Jean Pelletier *det.*: Collected material: Fir grove, 10.IV.2013, 1 specimen, HB *leg.* Oak grove, 20.VI.2014, 5 specimens, by sifting litter, OC *leg.*; 10-13.XI.2015, 3 specimens, by sifting litter, OC *leg. det.* Distribution: Morocco (Borovec 2013).

*Echinodera rifensis* (Stüben, 2001): [S], [E]. Collected material: Oak grove, 20.VI.2014, 2 specimens, by sifting, P.E. Stüben *det.*, HB & OC *leg.* Fir grove, 4 specimens, by sifting, 10-13.XI.2015, HB & OC *det. leg.* Distribution: Morocco (Stüben & Zarazaga 2013).

*Gonocleonus cf. sculptissimus* (Escalera, 1925): [E]. Jean Pelletier *det.*: Collected material: Fir grove of Tazaout, 10.IV.2013, 1 specimen, LV *leg.* Distribution: Morocco (Meregalli & Fremuth 2013).

*Kyklioacalles (Acalles) granulicollis* (Tournier, 1875): [S], [E]. P.E. Stüben *det.*: Collected material: Fir grove, 20.VII.2014, 15 specimens, LV, HB & OC *leg.*, 20 specimens, from rearing collar and dead branches of *Bupleurum spinosum* LV, HB & OC *leg.*, 12.XI.2015, 2 specimens, by sifting, HB *det. leg.* Distribution: Morocco (Stüben & Bayer 2015).

*Kyklioacalles tidiquinensis* (Stüben, 2002): [S], [E]. Collected material: Oak grove, 20.VI.2014, 1 specimen, by sifting, Stüben *det.* and HB *leg.* 10-13.XI.2015, 1 specimen, by sifting, OC *det. leg.* Fir grove, 10-13.XI.2015, 3 specimens, by sifting, HB *det. leg.* Distribution: Morocco (Stüben & Alonso-Zarazaga 2013).

*Magdalis duplicata* (Germar, 1819): [S], [N]. Collected material: Fir grove, 31.VII.2013, 1 specimen, Polytrap traps, Gabriel Alziar *det.*, YB *leg.* Distribution: Europe, Asia (Barrios & Korotyayev 2013).

*Mogulones geographicus* (Goeze, 1777): [N]. Collected material: Fir grove, 04.VI.2013, 1 specimen, Polytrap traps, Gabriel Alziar *det.*, YB *leg.* Distribution: Europe, Algeria, Mauritania, Tunisia (Colonnelli 2013).

*Otiorrhynchus (Lixorrhynchus) incisus* (Bialooki, Germann & Pelletier 2015): [N], [E]. Collected material: Fir grove, 15.V.2014, 2 specimens, Polytrap traps, Bialooki, Germann & Pelletier *det.*, YB, NM, LV, OC, HB *leg.* Distribution: Morocco (Bialooki *et al.* 2015).

*Oxystoma pomonae* (Fabricius, 1798): [N]. Jean Pelletier *det.*: Collected material: Fir grove, 04.IX.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: Europe, Algeria, Iran, Siberia (Alonso-Zarazaga 2011).

*Phyllobius maroccanus* (Peyerimhoff, 1921): [E]. Jean Pelletier *det.*: Collected material: Fir grove, 15.V.2014, 2 specimens, Polytrap traps, 15.VI.2014, 3 specimens, Polytrap traps, 19.VI.2014, 1 specimen, Polytrap traps, 15.VII.2014, 1 specimen, Polytrap traps. All YB *leg.* Distribution: Morocco (Alonso-Zarazaga 2013).

*Polydrusus flavipes flavipes* (DeGeer, 1775): [N]. Jean Pelletier *det.*: Collected material: Fir grove, 30.VI.2014, 1 specimen, Polytrap traps, YB *leg.* Distribution: Europe, west Siberia (Yunakov 2013a).

*Strophosoma pardoii* (Hoffman, 1953): [E]. HB *det.*: Collected material: Oak grove, 10.IV.2013, 1 specimen, HB *leg.* Distribution: Morocco (Yunakov 2013b).

#### (Scolytinae)

*Hylastes attenuatus* (Erichson, 1836): [S], [N]. Thierry Noblecourt *det.*: Collected material: Fir grove, 15.V.2014, 6 specimens, Polytrap traps, 30.V.2014, 1 specimen, Polytrap traps, 19.VI.2014, 1 specimen, Polytrap traps, 16.VII.2014, 1 specimen, Polytrap traps; All YB *leg.* Distribution: Europe, Mauritania, Asia (Knizek 2011).

**Table 1.** List of beetle species as heritage of the Talassemtane National Park, Morocco.

N°	Families	Species	Status
1	Aderidae	<i>Anidorus sanguinolentus</i> (Kiesenwetter 1861)	New addition
2	Alexiidae	<i>Sphaerosoma tingitanum</i> (Peyerimhoff 1917)	Endemic
3	Bothrideridae	<i>Bothrideres interstitialis</i> (Hayeden 1870)	Rare
4	Chrysomellidae (Bruchinae)	<i>Bruchus venustus</i> (Fåhraeus 1839)	New addition
5	Buprestidae	<i>Anthaxia carmen maroccana</i> (Schaefer 1937)	Endemic
6	Buprestidae	<i>Anthaxia midas oberthuri</i> (Schaefer 1937)	Rare
7	Buprestidae	<i>Anthaxia pleuralis aida</i> (Cobos 1956)	Endemic
8	Buprestidae	<i>Buprestis flavoangulata</i> (Fairmaire 1856)	Rare
9	Cantharidae	<i>Malthinus intermedius</i> (Wittmer 1971)	Endemic
10	Cantharidae	<i>Malthinus otini</i> (Wittmer 1971)	Endemic
11	Cantharidae	<i>Malthinus vaucheri</i> (Pic 1901)	Endemic
12	Cantharidae	<i>Rhagonycha cf. fulvonigra</i> (Dahlgren 1972)	Endemic
13	Cantharidae	<i>Rhagonycha quadricollis</i> (Kiesenwetter 1852)	New addition
14	Cantharidae	<i>Rhagonycha tangeriana</i> (Pic 1903)	Endemic
15	Carabidae	<i>Acinopus diana</i> (Schatzmayers 1943)	Endemic
16	Carabidae	<i>Acinopus picipes</i> (Olivier 1795)	New addition
17	Carabidae	<i>Laemostenus (Antisphodrus) ambroggi</i> (Antoine 1961)	Endemic
18	Carabidae	<i>Brachynus andalusiacus mauretanicus</i> (Bedel 1914)	Endemic
19	Carabidae	<i>Calathus semisericeus</i> (Fairmaire 1879)	Endemic
20	Carabidae	<i>Carabus famini favieri</i> (Fairmaire 1859)	Endemic
21	Carabidae	<i>Cymindis cobosi</i> (Mateu 1965)	Endemic

22	Carabidae	<i>Eocarterus (Baeticocarus) baeticus</i> (Rambur, 1837)	New addition
23	Carabidae	<i>Microlestes abeillei</i> (Brisout de Barneville 1885)	New addition
24	Carabidae	<i>Orthomus tazekensis rifensis</i> (Wrase & Jeanne 2005)	Endemic
25	Carabidae	<i>Paussus otini</i> (Antoine 1944)	Endemic
26	Cerambycidae	<i>Chlorophorus favieri</i> (Fairmaire 1873)	Endemic
27	Cerambycidae	<i>Ergates faber opifex</i> (Mulsant 1851)	Rare
28	Cerambycidae	<i>Nathrius berlandi</i> (Villers 1946)	Endemic
29	Cerambycidae	<i>Pogonocherus pesarinii</i> (Sama 1993)	Endemic
30	Cerambycidae	<i>Rhagium inquisitor cedri</i> (Reymond 1953)	Rare
31	Cerambycidae	<i>Semanotus laurasii laurasii</i> (Lucas 1852)	Rare
32	Cerambycidae	<i>Stictoleptura tangeriana</i> (Tourmier 1875)	Endemic
33	Cerylonidae	<i>Philothermus semistriatus</i> (Perris 1865)	Rare
34	Ciidae	<i>Cis corioli</i> (Peyerimhoff 1915)	New addition
35	Cleridae	<i>Opilo barbarus</i> (Abeille de Perrin 1893)	Rare
36	Cleridae	<i>Trichodes moghrebicus</i> (Lesne 1925)	Endemic
37	Cleridae	<i>Korynetes geniculatus</i> (Klug 1842)	Rare
38	Coccinellidae	<i>Lithophilus rifensis</i> (Iablokoff-Khnzorian 1974)	Endemic
39	Coccinellidae	<i>Nephus bipunctatus</i> (Kugelann 1794)	New addition
40	Coccinellidae	<i>Nephus quadrimaculatus</i> (Herbst 1783)	New addition
41	Coccinellidae	<i>Novius cruentatus</i> (Mulsant 1850)	New addition
42	Coccinellidae	<i>Oenopia conglobata</i> (Linnaeus 1758)	New addition
43	Coccinellidae	<i>Scymnus mimulus</i> (Fürsch 1958)	Endemic
44	Cryptophagidae	<i>Atomaria nigripennis</i> (Kugelann 1794)	New addition
45	Cryptophagidae	<i>Caenoscelis mussardi</i> (C. Johnson & Bowstead 2003)	Endemic
46	Cryptophagidae	<i>Cryptophagus cylindrellus</i> (Johnson 2007)	New addition
47	Cryptophagidae	<i>Cryptophagus jakowlewi</i> (Reitter 1888)	New addition
48	Cryptophagidae	<i>Cryptophagus pallidus</i> (Sturm 1845)	New addition
49	Cryptophagidae	<i>Cryptophagus turcicus</i> (Gillerfors & Otero 1993)	New addition
50	Cryptophagidae	<i>Cryptophagus spadiceus</i> (Falcoz 1925)	New addition
51	Curculionidae	<i>Acalles parasierae</i> (Stüben 2002)	Endemic
52	Curculionidae	<i>Aspidapion soror</i> (Rey 1895)	New addition
53	Curculionidae	<i>Caenopsis peyerimhoffi</i> (Hustache 1935)	Endemic
54	Curculionidae	<i>Echinodera rifensis</i> (Stüben 2001)	Endemic
55	Curculionidae	<i>Gonocleonus cf. sculptissimus</i> (Escalera 1925)	Endemic
56	Curculionidae	<i>Kyklioacalles (Acalles) granulicollis</i> (Tourmier 1875)	Endemic
57	Curculionidae	<i>Kyklioacalles tidiquinensis</i> (Stüben 2002)	Endemic
58	Curculionidae	<i>Magdalis duplicata</i> (Germar 1819)	New addition
59	Curculionidae	<i>Mogulones geographicus</i> (Goeze 1777)	New addition
60	Curculionidae	<i>Otiorhynchus (Lixorrhynchus) incisus</i> (Bialooki, Germann & Pelletier 2015)	New addition
61	Curculionidae	<i>Oxystoma pomonae</i> (Fabricius 1798)	New addition
62	Curculionidae	<i>Phyllobius maroccanus</i> (Peyerimhoff 1921)	Endemic
63	Curculionidae	<i>Polydrusus flavipes flavipes</i> (DeGeer 1775)	New addition
64	Curculionidae	<i>Strophosoma pardoi</i> (Hoffman 1953)	New addition
65	Dasytidae	<i>Aplocnemus andalusicus</i> (Rosenhauer 1856)	New addition
66	Dasytidae	<i>Aplocnemus montivagus</i> (Rosenhauer 1856)	New addition
67	Dasytidae	<i>Dasytes setosus</i> (Waltl, 1835)	New addition
68	Dasytidae	<i>Dasytidius pardoi</i> (Majer 1990)	Endemic
69	Dasytidae	<i>Mauroania longula</i> (Desbrochers des Loges 1889)	New addition
70	Dermestidae	<i>Dermestes gyllenhali gyllenhali</i> (Castelnau 1840)	New addition
71	Dermestidae	<i>Globicornis</i> sp. nov.	New species
72	Elateridae	<i>Ampedus aurilegulus</i> (Schaufuss 1863)	Rare
73	Elateridae	<i>Ampedus rifensis</i> (Platia 2008)	Endemic



74	Elateridae	<i>Athous olcese</i> (Buysson 1905)	Endemic
75	Elateridae	<i>Elathous talassemtani</i> (Németh & Platia 2015)	New addition
76	Elateridae	<i>Harminius rifensis</i> (Cobos 1969)	Endemic
77	Elateridae	<i>Megathous escalera</i> (Cobos 1958)	Endemic
78	Erotylidae	<i>Triplax lacordairei</i> (Crotch 1870)	Rare
79	Erotylidae	<i>Triplax bedeli</i> (Reitter 1888)	Endemic
80	Eucnemidae	<i>Hylis simonae</i> (Olexa 1970)	New addition
81	Histeridae	<i>Cylister filiforme</i> (Erichson 1834)	New addition
82	Histeridae	<i>Gnathoncus nannetensis</i> (Marseul 1862)	New addition
83	Histeridae	<i>Hister illigeri</i> (Duftschmid 1805)	New addition
84	Histeridae	<i>Plegaderus dissectus</i> (Erichson 1839)	New addition
85	Histeridae	<i>Sternocoelis alluaudi</i> (Théry 1921)	Endemic
86	Hydrophilidae	<i>Cercyon obsoletus</i> (Gyllenhal 1808)	New addition
87	Laemophloeidae	<i>Notolaemus castaneus</i> (Erichson 1845)	New addition
88	Lampyridae	<i>Nyctophila confusa confusa</i> (Geisthardt 1982)	Endemic
89	Latridiidae	<i>Dienerella</i> sp. nov.	New species
90	Lucanidae	<i>Pseudolucanus barbarossa</i> (Fabricius 1801)	Rare
91	Lycidae	<i>Lycostomus vaucheri</i> (Bourgeois 1905)	Rare
92	Lycidae	<i>Pyropterus rubripes</i> (Pic 1897)	Rare
93	Malachiidae	<i>Attalus iguermalensis</i> (Escalera 1936)	Endemic
94	Malachiidae	<i>Axinotarsus robustus</i> (Pic 1905)	Endemic
95	Melandryidae	<i>Marolia grandis</i> (Peyerimhoff 1917)	New addition
96	Melandryidae	<i>Orchesia micans</i> (Panzer 1793)	New addition
97	Melandryidae	<i>Ruschia parreyssi</i> (Mulsant 1856)	New addition
98	Melolonthidae	<i>Amphimallon amphibolum</i> (Peyerimhoff 1949)	Endemic
99	Melolonthidae	<i>Amphimallon theryi</i> (Peyerimhoff 1945)	Endemic
100	Melolonthidae	<i>Euserica alcaidei</i> (Baraud 1965)	Endemic
101	Melolonthidae	<i>Euserica cobosi</i> (Baraud 1965)	Endemic
102	Melolonthidae	<i>Polyphylla fullo macrocera</i> (Reitter 1891)	Endemic
103	Melolonthidae	<i>Rhizotrogus alcaidei</i> (Baraud 1971)	Endemic
104	Monotomidae	<i>Rhizophagus ferrugineus</i> (Paykull 1800)	New addition
105	Mycetophagidae	<i>Esarcus</i> cf. <i>letourneuxi</i> (Raffray, 1873)	New addition
106	Nitidulidae	<i>Pityophagus laevior</i> (Abeille de Perrin 1892)	New addition
107	Prostomidae	<i>Prostomis</i> cf. <i>mandibularis</i> (Fabricius 1801)	Rare
108	Ptinidae	<i>Ptinus aubei</i> (Boieldieu 1854)	New addition
109	Salpingidae	<i>Cariderus aeneus</i> (Olivier 1807)	New addition
110	Scarabaeidae	<i>Onthophagus atricapillus</i> (d'Orbigny 1908)	Endemic
111	Scolytinae (Curculionidae)	<i>Hylastes attenuatus</i> (Erichson 1836)	New addition
112	Scraptidae	<i>Anaspis maroccana</i> (Fleicher 1909)	Endemic
113	Staphylinidae	<i>Bryaxis rifensis</i> (Besuchet, 1962)	Endemic
114	Staphylinidae	<i>Geopselaphus depressus</i> (Besuchet, 1961)	Endemic
115	Staphylinidae	<i>Micropeplus staphylinoides</i> (Marsham 1802)	New addition
116	Tenebrionidae	<i>Alphasida (Machlasida) kraatzi parallelissima</i> (Escalera 1927)	Endemic
117	Tenebrionidae	<i>Asida (Planasida) septemsis</i> (Vera, Ruiz & Avila 2012)	Endemic
118	Tenebrionidae	<i>Clamoris crenatus</i> (Mulsant 1854)	Rare
129	Tenebrionidae	<i>Dendarus insidiosus riffensis</i> (Escalera 1944)	Endemic
120	Tenebrionidae	<i>Gonocephalum granulatum</i> (Fabricius, 1792)	Endemic
121	Tenebrionidae	<i>Heliopates rectangularis</i> (Antoine, 1951)	Endemic
122	Tenebrionidae	<i>Helops insignis maroccanus</i> (Fairmaire 1873)	Endemic
123	Tenebrionidae	<i>Hymenophorus candeli</i> (Pardo-Alcaide 1978)	Endemic
124	Tenebrionidae	<i>Lagria theryi</i> (Pic 1938)	Endemic
125	Tenebrionidae	<i>Misolampus goudotii</i> (Guérin-Méneville 1834)	Endemic
126	Tenebrionidae	<i>Mycetochara</i> cf. <i>maura</i> (Fabricius 1792)	Rare
127	Tenebrionidae	<i>Nalassus (Helopocerodes) marteni</i> (Español 1953)	Endemic

128	Tenebrionidae	<i>Opatrum (Colpophorus) rifense</i> (Kocher 1945)	Endemic
129	Tenebrionidae	<i>Pachychila forticornis</i> (Escalera 1923)	Endemic
130	Tenebrionidae	<i>Pachychila salzmanni jordanai</i> (Escalera 1925)	Endemic
131	Tenebrionidae	<i>Pentaphyllus chrysomeloides</i> (Rossi, 1792)	Rare
132	Tenebrionidae	<i>Pimelia atlantis</i> (Solier 1836)	Endemic
133	Tenebrionidae	<i>Stenosis lafanecherei</i> (Antoine 1951)	Endemic
134	Tetatomidae	<i>Tetratoma bauduerei</i> (Perris 1864)	Rare
135	Throscidae	<i>Aulonothroscus intactus</i> (Peyerhimmoff 1949)	Endemic
136	Trogossitidae	<i>Temnochila caerulea</i> (Olivier 1790)	Rare
137	Zopheridae	<i>Synchita undata</i> (Guérin-Ménéville 1844)	New addition

## Discussion

Present study reveals the primary data on the diversity of Coleoptera and adds to the knowledge on Moroccan Coleoptera. Of the 137 species reported in this document, 60 are saproxylic and 22 amongst them are addition to the Moroccan fauna. In fact, saproxylic beetles present a great diversity and a specific ecological requirement, which allow them to be excellent indicators of habitats complexity and forest sites (Brustel 2001). They represent an interesting model for studying forest response to disturbances (Bouget 2004).

In our survey, 20 rare saproxylic species have been recorded in the PNTLS. The rare taxa are a source of interest for conservation because the rarity of a species is defined by its specialization towards habitat (trophic requirements) within its range (Gaston 1994). The presence of rare species in the PNTLS and especially in its fir forests is indicative of a high heritage value but also a need for intervention by managers for their conservation. One species, *Triplax lacordairei* (Crotch, 1870) (Erotylidae) is on the red list in Europe as endangered (EN). A probably new species of *Prostomis* sp. (Prostomidae), which has yet to be described, is likely be close, in its ecology, to a Near Threatened (NT) european species: *Prostomis mandibularis* (Fabricius, 1801). This species was found in red decay of tree trunks lying on the ground. Three other species are on the Red List as at least concern species (LC): *Semanotus laurasii laurasii* (Lucas, 1852) (Cerambycidae), *Ampedus aurilegulus* (Schaufuss, 1863) (Elateridae) and *Temnochila caerulea* (Olivier, 1790) (Trogossitidae). Some species mentioned in this document will eventually be included in the next Red List of Mediterranean saproxylic beetles (IUCM pers. comm.).

Endemic species represent a particular class of rare species (Gaston 1994). 67 species endemic to Morocco are present in the study area and 18 species of them are saproxylic. The Rif Mountains in Morocco and those of the Sierra de Grazalema and Sierra de las Nieves as well as the Sierra Nevada in Spain, all are part of the Baetic–Rif Arc and resulting from the alpine orogeny due to the collision of the African and Eurasian plates. They are part of the Intercontinental Biosphere Reserve of the Mediterranean and are home to two fir species quite similar and threatened, which are *Abies marocana* Trab. and *Abies pinsapo* Boiss. (Vela 2002). This ecological and biogeographical proximity can be illustrated in beetles by the presence of endemic species, as *Eocaraterus (Baeticocarus) baeticus* (Rambur, 1837) (Carabidae) which was considered endemic to the Sierra Nevada (Spain) has been found in Morocco for the first time.

Besides the rare and endemic species, 48 were new record for Morocco out of which 4 resulted new to science and were described in recent years: *Otiorhynchus (Lixorrhynchus) incisus* (Curculionidae) (Bialooki *et al.* 2015), *Elathous talassemtani* (Németh *et al.* 2015) (Elateridae), *Globicornis* sp. nov. (submitted by Kadej *et al.* in 2016) (Dermestidae) and

*Dienerella* sp. (Otero *et al.* submitted). Twenty four species are new to North Africa, among them *Hylis simonae* (Olexa, 1970), cited as Near Threatened (NT) by the red list of IUCN.

This study also allowed the rediscovery of some species, which were known only by the holotype, among them *Kyklioacalles granulicollis* (Tournier, 1875), which was described from Tangier (Morocco) and whose type specimen was missing, hence the neotype was designated by Stüben & Bayer (2015).

The presence of such beetles' biodiversity at the Talassemtane National Park can only approve its heritage significance. Managers of this biodiversity hot spot, are required to entrust more interest and conservation efforts, reducing the unsustainable practices (overgrazing, fire...) that exist in this "protected" area. It is essential to make improvements on conservation actions by making more efforts on protecting the last Moroccan fir forests by strengthening forest vigilance and raising awareness of local populations. Sustainable management of this heritage requires taking into account all functions and uses that the PNTLS had to offer (ecological, economic, tourism...) and their integration to management reflections undertaken by the different concerned parties.

## Acknowledgements

We thank the Project financers (Agronomic Research Program for Development (PRAD), joint action of the French Ministry of the Foreign affairs, the Moroccan Ministry of Agriculture and the Maritime fishing and the High Commission of Waters, Forests and Fight against Desertification (HEFLCD). Thanks are due to Gabriel Alziar, Thomas Barnouin, Benjamin Calmont, Robert Constantin, J-P Coutanceau, Yves Gomy, Jean Gourvès, Bernard Junger, Marcin Kadej, Ondřej Konvička, Geoffrey Miessen, Tamás Németh, Thierry Noblecourt, José-Carlos Otero, Jean Pelletier, Jérôme Petitprêtre, Pierre Queney, Olivier Rose, Fabien Soldati, Peter Stüben, Yves Thieren and Tomas Yelamos, for their valuable identifications of different specimens and for Pierre Zagatti for his photography. We also thank the Regional Direction of Waters and Forests and the fight against the desertification of the Rif (DREFLCD-Rif) and Mr. Anwar Jaoui Director of the Talassemtane National Park, for their assistance. Thanks to Mr. Said Hajib Director of the Center for Forestry Research (CRF-Rabat), to Hassan El Dahmani for his contribution to field research, to Moustafa Naïma, to have guided and led us on the Moroccan roads, like Mohamed Guenbour for the participation at installation, records and monitoring of the traps.

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**Received:** 11.04.2016    **Accepted:** 24.06.2016    **Published:** 06.07.2016

**Cite paper:** Benyahia Y., Brustel H., El Antry S., Courtin O., Maatouf N., Valladares L. & Rohi L. 2016. Preliminary list of Coleoptera heritage species of the Talassemtane National Park, Morocco. *Journal of Insect Biodiversity* 4(13): 1–30.

<http://dx.doi.org/10.12976/jib/2016.4.13>

<http://www.insectbiodiversity.org>