**Introduction**

Not much, if any, work has looked at the rove beetle (Staphylinidae) fauna of the western Aegean islands before. Based on two recent targeted trips, the Staphylinidae fauna of Skyros island is updated with new knowledge. Skyros is with an area of approximately 209 km2 the largest of the Thellesian Sporades, a group of islands within the Aegean archipelago. It is situated in the western Aegean Sea, quite isolated from other islands with the closest being Euboea 40 km away, which is slightly closer than the Greek mainland. Additionally, it is approximately 50 km from the remaining Thellasian Sporades. Our study group, the Staphylinidae, commonly known as rove beetles, are an extremely diverse group of beetles with more than 60.000 species currently known (Solodovnikov et al., 2013). They are very diverse in their ecological preference as well as their feeding habits and are found in almost all habitats across Earth (Thayer, 2016). While generally quite small, usually from 4 to 8 mm, some species grow to be more than 30 mm. Most species are quite flat and slender, with shortened elytra and flexible abdomen, which make them able to maneuver through small spaces (leaf litter, under bark, crevices, etc.) (Thayer, 2016).

Two targeted trips included here were conducted, one for nine days in 2015 and one for five days in 2019. On these trips we collected as broadly as possible, to get closer to a true species list for the island and thus we used both various methods and habitats to get as broad a sample as possible. Although no previous trip to Skyros had been made, Volker Assing har been collecting the Staphylinidae of the Aegean islands for the past twenty-odd years. He has collected from Chios (Assing, 2015a, 2016a), Corfu (Assing et al., 2018), Crete (Assing, 2013a, 2015b), Cyprus (Assing, 2017b, 2017a; Assing and Wunderle, 2001), Ikaria (Assing, 2017c), Karpathos (Assing, 2016b), Kos (Assing, 2017a), Lesbos (Assing, 2005, 2016a, 2017a), Rhodes (Assing, 2013b, 2017a) and Samos (Assing, 2015c, 2016a, 2017a).

Skyros stretches roughly from north-west to south-east with two major mountains and a depression in the middle of the island. Mount Kochylas is tallest at 792m and dominates the south-eastern part, while Mount Olympus is quite a bit lower at 402 in the north-western part. We see that the north-western part has large areas covered in coniferous forests, especially *Pinus halepensis* Miller, maquis with Juniperus phoenicea L., and is generally covered in lush, green vegetation. The south-eastern part is mostly covered in dry, spiny phrygana an maquis containing *Quercus coccifera* L. 1753*,* *Quercus ilex* L. and *Acer sempervires* L.. The lower parts of the island contain some beaches with large amounts of dry and wet seaweed, and in some of the higher places we see bare, steep cliffs. The south-eastern part is largely uninhabited with only few permanent structures to be found, most being near or by the coast, while the northern part contains the main city of the island as well as other, smaller settlements. The whole island shows signs of extensive grazing by the goats which can be seen roaming the islands, with large flocks being seen especially in the south-eastern part. Some wild, roaming horses can also be seen on the south-eastern part of the island where they also contribute slightly to the grazing.

**Materials and Methods**

We have gathered our data from two trips to Skyros, one in April of 2015 and one in the end of March of 2019. While the first trip was under decent collecting conditions, with warm and sunny weather, the second trip was during a very cold and windy week, following a very cold winter. To collect, we sifted various types of debris, set pitfall traps as well as hand collecting from ground-based microhabitats, carcasses found in the wild and in goat, sheep, horse and cow dung. We also swept vegetation in certain localities and installed a combined Flight Intercept Trap (FIT) and Malaise trap at site E. Most of our sifted material was from leaf litter or other similar plant debris, while a couple of samples were collected sifting soil around grass roots. The sifted material was sorted using both Winkler eclectors as well as manually in warm conditions to extract as many specimens as possible. Salted water and cheap Greek wine were used as a preservative for the lower pans of the FIT as well as the pitfall traps set during the first trip. All hand- or trap-collected material was eventually preserved in containers within 96% alcohol.

Below is a full list of localities, and a map showing the distribution of these sites has also been generated (figure 1):  
GREECE, Skyros Isl., list taken entirely from (Kræmer, 2015)**:** leg. L. Kræmer, A. Brunke, S. Selvantharan & A. Solodovnikov 2015: **A:**1 km E of Skyros airport nr. Trachy, N38°57.561’, E024°30.096’, 20 m, 16.IV.2015, farmland, sifting debris and hand collecting nr. creek.; **B:** S of the airport, N38°56.726’, E024°29.029’, 50 m, 11.IV.2015, pine forest: a) sifting leaf litter, b) sweeping vegetation.; **C**: 0.91 km N of Atsitsa, N38°55.584’, E024°27.933’, 16.IV.2015, stony beach, in seaweeds.; **D**: S of Atsitsa, N38°54.690’, E024°28.358’, 110 m, 11.IV.2015, pine forest/evergreen understory: a) sifting in creek valley; b) under bark.; **E**: 3.3 km SW of Atsitsa, N38°54.127’, E024°29.961’, 200 m, 12.IV.2015, pine forest/evergreen understory: a) sifting leaf litter, b) sweeping vegetation, c) FIT d)Malaise trap, e) pitfall traps.; **F**: 1.4 km S of Skyros nr. Lino, N38°53.539’, E024°34.373’, 18.IV.2015, sandy pebble beach, sifting seaweeds.; **G**: Nr. Aghios Fokas, N38°52.458’, E024°28.756’, 10 m, 12.IV.2015, hillside nr. coast w. *Euphorbia*: a) sweeping vegetation, b) under stones.; **H**: Dekatria Hill, SW slopes, N38°52.039’, E024°30.035’, 250 m, 12.IV.2015, dry pine forest/scrubby understory: a) sifting leaf litter, b) under bark.; **I**: Kochylas Range, NW slopes, N38°50.902’, E024°35.124’, 440 m, 14.IV.2015, maple forest: a) sifting leaf litter, b) under rocks, c) hand collected.; **J**:Kochylas Range, NW slopes, N38°50.647’, E024°35.484’, 580 m, 14.IV.2015, maple forest:a) sifting leaf litter, b) in dung.; **K**: Kochylas Range, SW slopes, N38°50.382’, E024°34.919’, 300 m, 13.IV.2015, rocky pastures. *Euphorbia*: a) under stones, b) in dung, c) on carrion.; **L**: Kochylas Range, SW slopes, N38°50.210’, E024°35.424’, 530 m, 13.IV.2015, maple forest: a) sifting leaf litter, b) under stones, c) pitfall traps.; **M**: Kochylas Range, NW slopes, N38°50.238’, E024°35.554’,550 m, 17.IV.2015, maple forest: a) sifting leaf litter, b) on ground.; **N**: Kochylas Range, NW slopes, N38°50.011’, E024°35.799’, 640 m, 17.IV.2015, maple dominated forest: a) sifting leaf litter, b) hand collecting.

Greece, Skyros isl. From our current trip: leg. A. Bogri, A. K. Hansen, A. Marstrand, A. Solodovnikov 2019: **O:** SE of Nifi, N38°48.355', E24°34.461', 0 m, 27.III.2019, grazed meadow with *Quercus coccifera* patches: a) sifting leaf litter, b) sifting meadow and grass, c) under rocks, d) pitfall traps.; **P:** SE of Nifi, N38°48.321', E24°35.208', 103 m, 27.III.2019, dry creek in *Quercus* and *Acer* forest: a) sifting litter and flood debris, b) hand collecting,c) pitfall traps.; **Q:** Around Skyrian Horse Lake, N38°48.0510', E024°38.612', 373 m, 27.III.2019, meadow with artificial lake: a) on dung, b) under rocks.; **R:** SW of Skyros city, N38°53.469', E24°32.433', 44m, 28.III.2019, near lake, hand collecting.; **S:** SW of Skyros city, N38°53.400', E24°31.297', 137 m, 28.III.2019, *Pinus* forest with *Pinus brutia* and *Pinus halepensis*: a) sifting leaf litter, b) hand collecting.; **T:** SW of Skyros city, N38°54.1488', E24°30.2466', 217 m, 28.III.2019, pine forest with laurel: a) pitfall traps, b) hand collecting, c) sifting.; **U:** N of Atsitsa, N38°55.5852', E24°27.9646', 0 m, 28.III.2019, around beach and nearby meadow: a) sifting, b) hand collecting.; **V:** N of Skyrian Horse Lake, N38°48.278', E24°38.143', 384m, 29.III.2019, mountainous forest: a) hand collecting, b) sifting leaf litter.; **W:** Near Kalamitsa, N38°50.465', E24°33.913', 4m, 29.III.2019, beach with seaweed debris: sifting seaweed and other beach litter.

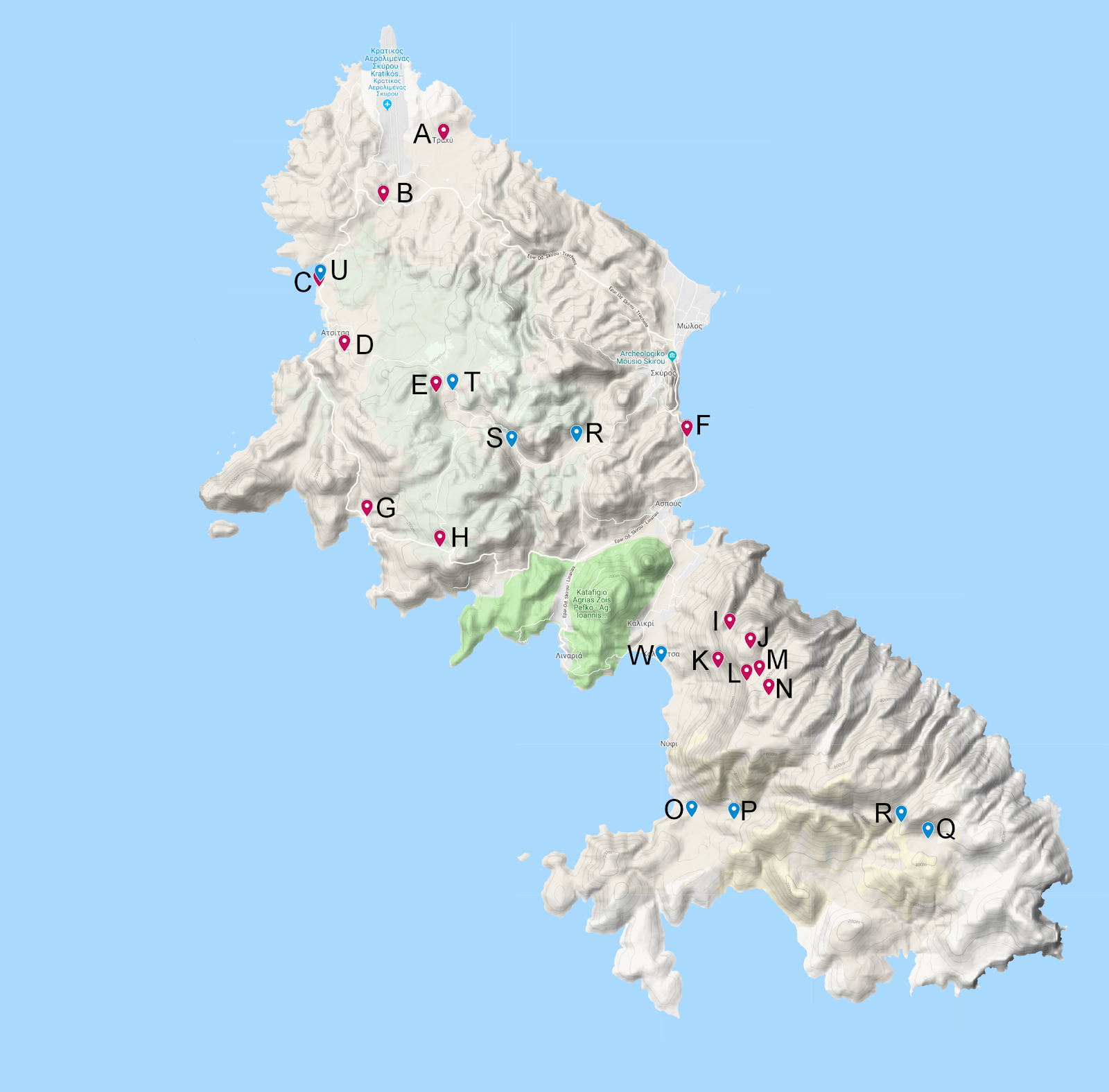


Figure 1. Sampling localities at Skyros Island. Localities marked in red (A-N) were sampled in 2015 and those marked in blue (O-W) were sampled in 2019.

**Results**

After our two trips to Skyros, we have collected a total of 65 species, although some remain identified only as morphospecies. These species are compiled below in table 1, with localities marked by their abbreviations.

|  |  |
| --- | --- |
| Species | Locality |
| **Omaliinae** |  |
| *Omalium cinnamomeum* Kraatz, 1857 | Ec(8)e(1), Ha(1), Ia(1), Ja(2), La(11), Ma(1), Na(7), |
| *Dropephylla gobanzi* Ganglbauer, 1904 | Ea(1) |
| **Proteinae** |  |
| *Megarthrus depressus* Paukull, 1789 | Lc(1) |
| *Proteinus atomarius* Erichson, 1840 | Da(1),Ec(6)e(4) |
| *Proteinus brachypterus* Fabricius, 1792 | Ec(1) |
| *Proteinus ovalis* Stephens, 1834 | Na(1) |
| **Micropeplinae** |  |
| *Arrhenopeplus cf. thrasicus/turcicus* | La(1) |
| **Tachyporinae** |  |
| *Lordithon thoracicus* Fabricius, 1777 | Ba(5), Da(2), Ec(2)d(2) |
| *Mycetoporus ignidorsum* Eppelsheim, 1880 | Da(1), Ec(1), Ha(3), Ja(2), La(2), Na(3), Pa(2), Vb(1) |
| *Mycetoporus mulsanti* Ganglbauer, 1895 | Ba(2), Da(2), Ea(2)c(1), Ha(3) |
| *Mycetoporus nr. altaicus* Luze, 1901 | Ba(1), Da(1), Ia(1), Ja(3), La(3), Na(1), Pa(1)c(1), Vb(2) |
| *Mycetoporus sp.* | Ja(1), La(2) |
| *Sependophilus sp.* | W(1) |
| *Tachyporus scitulus* Erichson, 1839 | Ab(1), Ed(2), F(2), La(1) |
| *Tachyporus solutus* Erichson, 1839 | Ed(1) |
| **Habrocerinae** |  |
| *Habrocerus piscidus* Korge, 1971 | Da(5), Ja(1), Ma(4), Vb(2) |
| **Aleocharinae** |  |
| *Alevonota rufotestacea* Kraatz, 1856 | Ia(1) |
| *Aloconota cambrica* Wollaston, 1855 | R(1) |
| *Aloconota gregaria* Erichson, 1839 | Ba(1), Ec(1) |
| *Atheta amicula* Stephens, 1832 | Ec(5)d(1)e(11), Lc(1) |
| *Atheta atramentaria* Gyllenhal, 1810 | Da(1), Ia(1), Lc(5) |
| *Atheta aquatilis* Thomsom, 1867 | Ec(3)d(4)e(5), La(5), Lc(3), Na(1), Ob(1), Pb(3) |
| *Atheta crassicornis* Fabricius, 1792 | Ec(4),d(1), La(5)c(6), Na(11) |
| *Atheta  fungi fungi* Gravenhorst ,1806 | Ec(1), La(1), Oa(14), Ob(1), Pb(9), Vb(10), W(2) |
| *Atheta (s. str.) graminicola* Gravenhorst, 1806 | Ec(1), La(1), Lc(2) |
| *Atheta orbata* Erichson, 1837 | Da(1), Ec(1),d(1), F(1), La(2), Na(2) |
| *Atheta (Ceritaxa) testaceipes* Heer, 1839 | Da(1) |
| *Atheta trinotata* Kraatz 1856 | La(4), Lc(7), Ma(3) |
| *Bolitobius sp. (n.?)* | Db(3) |
| *Dalotia coriaria* Kraatz 1856 | La(3), Ma(1), Na(1) |
| *Falagria sulcatula* Gravenhorst, 1806 | Sb(1) |
| *Geostiba oertzeni* Eppelsheim, 1888 | Ja(1), La(1), Lc(7), Ma(4), Na(12) |
| *Ischnopoda umbratica* Erichson, 1837 | Oa(26) |
| *Leptusa sp.* | C(3) |
| *Liogluta microptera* Thomson, 1867 | Ec(1) |
| *Myllaena intermedia* Erichson, 1837 | Oa(1) |
| *Ocalea badia* Erichson, 1837 | Ec(2), La(1), Na(1) |
| *Oxypoda abdominalis* Mannerheim, 1830 | Ia(1), La(2), Ma(1), Na(1), Vb(1) |
| *Oxypoda alternans* Gravenhorst, 1802 | Ee(3) |
| *Oxypoda induta* Mulsant & Ray 1861 | Ba(1), La(6), Lc(1), Ma(1), Na(4) |
| *Oxypoda opaca* Gravenhorst, 1802 | Ec(4)e(1) |
| *Oxypoda praecox* Erichson, 1839 | Da(1), Lc(2), Ma(1), Na(4) |
| *Oxypoda togata* Erichson, 1837 | Ed(1) |
| **Oxytelinae** |  |
| *Anotylus inustus* Gravenhorst, 1806 | Ba(20), C(1), Da(20), Ed(5), Hb(4), Ia(2), Ja(54)b(6), Lc(42), Ma(6) |
| *Anotylus sculpturatus* Gravenhorst, 1806 | Da(1), Ec(3)d(1), Ha(1), Ia(1), Ja(4)b(2), Ka(2)b(16), La(3)c(8), Ma(3) |
| **Steninae** |  |
| *Stenus erythrocnemus* Eppelsheim, 1884 | Aa(1) |
| *Stenus ludiy* Fauvel, 1886 | Da(15), Ea(1)c(1), Ha(10), Na(6) |
| *Stenus ochropus* Kiesenwetter, 1858 | Ba(37), Ha(3), Na(2), La(2) |
| *Stenus (Hypostenus) sp.* | Sa(1)b(1) |
| *Stenus (s. str.) sp.* | Aa(1), Sa(1) |
| **Scydmaeninae** |  |
| *Leptomastax sp.* | Sa(1) |
| **Paederinae** |  |
| *Astenus sp.* | W(1) |
| *Lathrobium creticum* ***???*** | Oa(2) |
| *Leptobium sp. n. cf creticum/graecum* | Ba(7), Ec(2), Ha(4), Ma(1), Oc(1), Qb(1), Sb(1), Vb(4) |
| *Medon apicalis* Kraatz, 1857 | Ba(1), Ec(1) |
| *Medon dilutus cephalus* Koch, 1938 | Oa(3) |
| *Medon dilutus pythonissa* Saulsy, 1864 | Ba(7), Da(6), Ea(4)c(5)d(7)e(1), Ha(16), Ia(4), Ja(17), La(9), Ma(2), Na(21), Oc(1), Vb(1) |
| *Medon fusculus* Mannerheim 1831 | Ja(2), Vb(2) |
| *Medon sp.* | Vb(1) |
| *Platydomene sp.* | W(2) |
| **Staphylininae** |  |
| *Dinothenarus flavocephalus* Goeze, 1777 | Bb(1), Jb(1) |
| *Heterothops dissimilis* Gravenhorst, 1802 | Ba(1), Ec(1) |
| *Hypnogyra sp. 1* | La(1) |
| *Hypnogyra sp. 2* | Vb(1) |
| *Ocypus mus* Brulle, 1832 | Lc(1), Ma(1) |
| *Ocypus picipennis* Fabricius, 1793 | Qb(1) |
| *Othius lapidicola* Markel & Kiesenwetter, 1848 | Ba(13), Ia(3), Ja(1), La(6), Ma(3), Na(3), Vb(1) |
| *Philonthus debilis* Gravenhorst, 1802 | Kb(5), Lc(1), Qb(1) |
| *Quedius humeralis* Stephens, 1831 | Ba(1), Ec(8)d(2), Ha(1), Ia(3), Ja(22), La(2)c(3), Ma(5), Vb(2) |
| *Quedius nivicola* Kiesenwetter, 1858 | Ja(2), Ma(1), Na(1) |
| *Quedius scintillans* Gravenhorst, 1806 | Ja(1), Lc(7), Na(1), Qb(1) |

Table 2. Species composition and distribution of Staphylinidae on Skyros. Localities (Capital letters) here match those in figure 1 as well as our list of localities (see Materials and Methods section). The collecting methods (lower case letters) are marked according to our list of localities. In brackets we indicate the number of specimens collected from each locality using the respective method. Some (A-N) are from an earlier trip (Kræmer, 2015), while the rest (O-W) are from our current trip.

**Discussion**

The Staphylinidae of Skyros are most like those of the Greek mainland. Most, but not all species found are shared with the mainland, and it is by far the place so far investigated which has the most overlap in species with Skyros. While it also has many species, which are found in Turkey, all but one (*Stenus erythrocnemus*, Eppelsheim, 1884) are also found in Greece. Although some of the species which we have found are not yet found among the remaining, sampled Aegean islands those which have been found are generally shared by more than one other island. Some species are also new to the Aegean (Stenus ludyi, Oxypoda abdominalis, alternans, praecox and togata, Liogluta microptera, Atheta aquatilis) although many of these are found in the Balkan regions bordering to the Aegean.

Most of the beetles which we have found are widespread, ranging from a few cosmopolitan species (5) over some Holarctic (8) and a lot of Palearctic(22) species to quite a few European (11) species. There is also quite a few mediterranian species (8) and only a few species which are contained mostly in the Aegean/Anatolian region (2/3 species). Thus we see that only a clear minority of the species which we have found are exclusive or near exclusive to the region.

We feel that our collecting has yielded a somewhat representative collection of the species list of the Skyrian rove beetles. Though we didn’t see much activity during our second trip neither above nor beneath cover, our first trip makes up for this. The large temperature difference between the trips makes the fauna found during the two collecting trips slightly different, and thus more representative of the actual, true species list found on the island.

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