Linzer biol. Beitr.	41/2	1937-1948	18.12.2009

Social wasps of Wetland Kerkini, northern Greece (Hymenoptera: Vespidae: Vespinae, Polistinae)

L. DVOŘÁK & G. RAMEL

A b s t r a c t : A report is presented on the faunistic and ecological research conducted on the social wasp fauna of the Greek National Park associated with Lake Kerkini, known as Wetland Kerkini. The national park is the largest in Greece and includes a wide variety of habitats, many of which were not included in this survey. From the areas sampled we recorded 13 species from four genera, of which four species are a new record for Greece: *Dolichovespula media* (new record for Greece of this spreading species), *D. saxonica* (first precisely located record for Greece, southern distribution limit in Europe), *Vespula rufa* (first published record for Greece, known from unpublished dissertation only; southern distribution limit in eastern Europe), and *Polistes biglumis* (first verified record for Greece).

K e y w o r d s : Hymenoptera, Vespidae, Vespinae, Polistinae, distribution, new finds, Greece.

Greece is one of the least entomologically surveyed countries in the whole of Europe. For this reason it was decided in August of 2003 to undertake a complete biodiversity assessment of the nature reserve associated with Lake Kerkini and known as Wetland Kerkini (Fig. 1) in so far as such a project could be carried out on a voluntary and unfunded basis.

It was obvious from the start that recording the diversity of the invertebrates, and within them the hexapods, would comprise the bulk of the work. The survey work, called Project Kerkini, has so far involved the assistance of more than 100 scientists in 17 countries around the world, and the organizers are extremely grateful for all the help that has been freely offered.

The wasps of Greece have not been studied in any systematic way. We know of several papers of different authors, but usually with very scarce data. Moreover, social wasps of the subfamilies Vespinae and Polistinae are not represented in all of these papers. Up to now, only three papers contain relatively abundant data on the social wasps of Greece: LECLERCQ 1956, BLÜTHGEN & GUSENLEITNER 1970, and ERLANDSSON 1974 (see ĆETKOVIĆ 2002 for more information). Unfortunately, these studies operated with records mainly from the south of the country. Our paper is the first one focussing on the northern part of Greece.

Study area

Lake Kerkini is an artificial lake, created in 1932 on the Strymon River immediately south of the Greek border with Bulgaria and 80 km north of Thessaloniki. The area was originally an inland delta, a huge marsh where the river unloaded the debris it had collected on its journey past the Ryla and Pirin mountains of Bulgaria, and as a wetland habitat it was unique in Europe. The area is currently a RAMSAR and NATURA2000 site as well as a Wetland of International Importance for birds.

To the north the lake is bounded by the 2000 metre Serbo-Macedonian massif (Kerkini Mts.), which forms the border with Bulgaria but which is split by the narrow Ruppel Gorge, through which the river enters Greece. To the southwest the lake is bordered by the 1000 metre Mavrovouni Mts. The nature reserve includes parts of both of these mountain ranges, extending to the summit of the Kerkini Mts., all of the riverine habitat between the border and the lake, about 20 km, and has a total area of about 200 square km. The vegetation of the area is classified as para-Mediterranean and montane Mediterranean.

Localities under study and sampling methods

Malaise traps

These are large permanent traps that can be placed in a suitable habitat. They are primarily aimed at flying insects such as bees, wasps, flies and some beetles, although they can catch anything. Flying (and crawling) insects are directed into a catching bottle, making use of their own innate responses. The catching bottle contains 70% ethyl alcohol as a killing and preserving agent. The bottle can then be changed once a week and the catch analysed at leisure.

Kerkini, Café Elodia, N=41°12’46.8", E=23°05’42.9", 40 m a.s.l. The trap was situated on the eastern side of the village of Kerkini in an area of rough grassland alongside the marshes of the old river bed. The trap was adjacent to the reeds and a willow (*Salix* sp.), about 2 metres from the actual water.

Kerkini, Kerkini Marsh, N=41°13’32.8", E=23°05’04.2", 45 m a.s.l. This was a small marsh on the northern edge of the village of Kerkini. Part of the site of the old river bed (the river was redirected in the 1950s), this site was supplied with a continual supply of fresh water from a standing pipe. An area of about 100 square metres was covered in a shallow flow, 5 to 15 cm deep, and supported a lot of emergent vegetation. To the west, and across the road to the east, were areas of reed and deeper water.

Kerkini, Krousia Mts., N=41°11’32.4", E=23°03’59.5", 190 m a.s.l. The lower, north facing slopes of the Krousia Mts. The trap was situated immediately beside a large stack of cut timber (mostly oak), with a number of other stacks nearby. The immediate vegetation was *Paliurus spina-christi* and *Carpinus orientalis*. A little further off (20+ metres) there was a mixed deciduous forest, dominated by Downy Oak (*Quercus pubescens*).

Kerkini, Pumping St., N=41°12’48.7", E=23°06’11.9", 40 m a.s.l. The fenced off area surrounding a pumping station that moved water out of the lake and into the canal system for the western side of the lake. It is relatively ungrazed, and stood adjacent to a canal

bordered with willows and reeds. It was moist site producing lush herbs and grasses.

Kerkini, Timber Yard, N=41°13'29.2", E=23°05'07.9", 45 m a.s.l. The trap was situated inside the yard of a timber merchant, standing beside a large pile of uncut logs (Poplar) with an arable field behind it. It was only run for a week.

Lithotopos, Ecotourism, N=41°08'15.6", E=23°13'01.2", 65 m a.s.l. This is a reasonably anthropogenic site, being set in a fallow field adjacent to the Centre for the Promotion of Ecotourism in Lithotopos. There is a small amount of building refuse on the site and it has been irregularly grazed for many years. The ground is stony, with a few trees around, mostly *Paliurus spina-christi*. The vegetation is otherwise mixed herbaceous/graminaceous and contains quite a few flowering plants. The soil is thin, the ground is stony and it has a north facing aspect. Yellow pan traps were also placed at this site.

Lithotopos, Kerkini Lake, N=41°09'06.5", E=23°11'55.0", 75 m a.s.l. The trap was situated 400 meters south of the lake. It was at the edge of an olive orchard; beside the fence, there was a hedge of native vegetation, dominated by *P. spina-christi*, about 5 metres wide, and a more mature olive plantation behind this. This is a dry habitat on siliceous soil, on a north facing slope with no grazing, 2.5 kilometres from the nearest village.

Neo Petritsi, Farfara, N=41°19'30.5", E=23°15'00.1", 750 m a.s.l. The trap was situated beside a fast flowing, permanent stream (called Sultanitsa locally). The site has a north-east facing aspect and is considerably colder than Ramna, which has the same altitude; the surrounding forest is Beech with some Alder along the stream's edge. The trap is in a slightly un-natural position, being on a ledge created by the cement works that direct the stream under the road.

Neo Petritsi, Midway, N=41°18'49.8", E=23°16'35.6", 750 m a.s.l. Dry, sunny, south-facing slope with a mixed deciduous forest dominated by *Acer campestre*, *Ostrya carpinifolia*, and *Quercus robur* around it. It was on an abandoned cleared track (5 metres wide on average) with a rich herbaceous plant community along it. Yellow pan traps were also placed at this site.

Neo Petritsi, Petritsi Stream, N=41°17'43.7", E=23°17'12.6", 250 m a.s.l. The trap was situated immediately beside a permanent stream (as above) 1 km (by road) up into the Kerkini Mts. from the village of Neo Petritsi. It has a south facing aspect and is surrounded by Plane Trees (*Platanus orientalis*). The area away from the stream is sharply inclined and dominated by *Quercus coccifera*. The area is grazed to some extent by sheep and goats but otherwise untouched.

Neo Petritsi, Sultanitsa, N=41°19'02.1", E=23°12'05.0", 1485 m a.s.l. This trap was situated over the bog/seep that is the start of the Sultanitsa stream. It is placed immediately above the place where the bog turns into a stream and enters a beech forest, and faces downhill into the forest. The glade is the result of human endeavour; the army used the site about 50 years ago, and currently it is grazed by cattle in the early summer.

Neo Petritsi, Stratiom, N=41°17'44.9", E=23°17'36.6", 420 m a.s.l. The trap was situated on a south facing slope covered in herbs and grasses; 6 metres behind it there was the *Quercus coccifera* forest that dominates these dry steep hillsides. Yellow pan traps were also placed at this site.

Promohonas, Procom, N=41°22'38.1", E=23°21'58.8", 60 m a.s.l. The trap was situated in a glade created by a massive fallen tree in a riverine forest along the banks of the

River Bisistrisa north of the village of Promohonas and half a kilometer from the shopping complex of Procom. At this point the river delineates the Greek border with Bulgaria. The forest is continuous for some kilometres and present on both sides of the river. It is grazed very little, if at all (by goats), and relatively untouched – there has been no logging in the last 50 years at least. However the understory vegetation is seriously affected by regular episodes of flooding in spring and early summer. The dominant tree species is White Poplar, wild Walnut and Hazelnut, while the lower vegetation is dominated by brambles (*Rubus* sp.) and an unidentified equisetum that grows to a height of 1.7 metres by late July. Yellow pan traps were also placed at this site.

Vironia, Beabies, N=41°19’15.4", E=23°13’39.6", 1150 m a.s.l. The trap was situated beside a fast flowing, permanent stream (Sultanitsa). It is in a natural mixed Beech and Fir forest, with a few other tree species occurring sporadically. It has a north to northeast facing aspect and there was still snow falling there in April. Although this site is logged about once every 25 years, it is otherwise undisturbed. Other vegetation includes brambles, wild rose and various herbs.

Vironia, Beles (Kerkini) Mts., N=41°17’19.5", E=23°12’18.4", 550 m a.s.l. A south facing slope of the Kerkini Mts. It is a rich meadow, cut about twice a year, backing onto mixed deciduous forest. It is a relatively moist habitat on siliceous soils with abundant, luxurious vegetation. The meadow is on the site of the old village of Ramna, which was abandoned after World War II; it is fenced off, so it is not subject to any grazing, or dunging pressure. It changes drastically throughout the year: by June the vegetation is two metres tall in places, but the snow in winter flattens all the herbaceous vegetation.

Vironia, Ramna, N=41°17’42.5", E=23°11’33.1", 630 m a.s.l. The trap was situated beside a fast flowing, permanent stream. It has a south facing aspect and is surrounded by mixed deciduous forest. It is well shaded, and has a good understory until around the 22nd of May, with the arrival of cattle. As of June the 1st the herbaceous understory was almost completely removed and the cows moved on, but the vegetation never recovered its spring level of cover.

Banana traps and wine traps

These are baited traps, in which the insects, mostly bees, wasps, flies, and beetles, are caught because they come to the smell of the bait. They are usually suspended in trees. They are both the same design, consisting in a container (a 1.5 litre cola bottle for example) with an entrance hole cut near the neck and wine, sweetened and fortified with ethanol, or rotting banana in alcohol at the bottom. These traps catch particular groups of insects not normally caught in Malaise traps, either because they normally fly too high above the ground, or are otherwise scarce, but are very messy.

Vironia, Kerkini Mts., N=41°17’28.6", E=23°13’13.7", 915 m a.s.l. Banana trap, tree 02. The trap was situated on the south facing side and is in mixed deciduous forest, dominated by Beech (*Fagus sylvatica*), but also with Oak (*Quercus* sp.), *Ostrya carpinifolia*, and *Tilia* sp. amongst others.

Vironia, Beabies, N=41°19’15.4", E=23°13’52.9", 1180 m a.s.l. Banana trap, tree 03. The trap was situated beside a fast flowing, permanent stream by the forest formed mostly by *Fagus* sp. and *Abies* sp.

Vironia, Ostrya, N=41°17'28.6", E=23°13'13.7", 915 m a.s.l. Wine trap, tree 2. The trap was situated in mixed deciduous forest on a mountain side.

Vironia, Kerkini, N=41°19'15.4", E=23°13'52.9", 1180 m a.s.l. Wine trap, tree 3. The trap was installed in mixed *Fagus sylvatica* and *Abies* sp. forest on the mountain side, half a km from the Beabies Malaise trap.

Yellow pan traps

These are traps aimed to catch insects that are attracted to flowers, and are simply a series of yellow (+ white, blue or orange) plates/bowls placed in suitable positions with a fluid in them. They are excellent for sampling a variety of habitats quickly, although more labour intensive than the traps mentioned above. If diluted yellow ethylene glycol and deep bowls are used, these traps can be left out for a week; however, as they are scattered over a large area (relative to the immoveable Malaise traps), it is impossible to fence them in for protection, and in the Kerkini National Park they were often kicked over or broken by livestock and so a different strategy was used. Traps would be put out near dusk, or early in the morning, and then collected again later in the day; many small insects fly preferentially at dawn and dusk, or early in the day. For this method the traps can be filled with water with just a little liquid soap in it to help reduce the surface tension of the water, which is better than using ethylene glycol. In this way a large number of traps, up to 50 or more, could be put out across a site, maximising micro-habitat sampling, and the catch was often equivalent to a week's Malaise trapping; 2 or 3 sites can be sampled in a single day, at different altitudes or aspects. Yellow pan traps were used at various sites throughout the national park to sample habitats 2 or 3 times a year that were not covered by the larger permanent traps.

Ano Paroia, Camp 1777, N=41°19'02"; E=23°04'38", 1600 m a.s.l. Yellow pan traps in the Kerkini Mts., above Base camp and Large Plateau. It is at the edge of the tree line, so the traps were in an area with subalpine vegetation, herbaceous *Thymus* and similar plants.

Ano Paroia, Large Plateau, 1000 m a.s.l. Yellow pan traps at a large plateau above the village of Ano Paroia. On the plateau there is an alder carr (*Alnus glutinosa*) (N=41°18'54", E=23°01'56"), pine forest, beech forest (N=41°18'53", E=23°01'46") and open areas of herbs and scattered small bushes like *Rosa* sp. and *Paliurus spina-christi*.

Lithotopos, Ecotourism, see the Malaise trap site above.

Megalohori, Megalohori 2, N=41°14'57.9", E=23°13'11.0", 38 m a.s.l. Yellow pan traps on the northeast corner of the Kerkini lake. The traps were situated near small pools surrounded by scrub, including *Rubus fruticosus* (Blackberry) wild cannabis 2.5 metres tall and willows. These areas are all regularly grazed by buffalo, cattle, goats and sheep. I t is also a site for rubbish dumping, mostly garden refuse.

Neo Petritsi, Kerkini Mts., N=41°18'40", E=23°13'02", 1500 m. Yellow pan traps in upland Forestry Pine plantation.

Neo Petritsi, Roupel's Gorge, N=41°17'32", E=23°19'35", 60 m a.s.l. Yellow pan traps in lowland Forestry Pine plantation.

Neo Petritsi, Saga, N=41°17'25", E=23°17'25", 355 m a.s.l. Yellow pan traps in *Quercus coccifera* scrub on mountain side.

Neo Petritsi, Stentori, Kerkini Mts., N=41°20'23", E=23°14'05", 1150 m a.s.l. Yellow

pan traps in mixed forest (deciduous and conifer), an abandoned anthropogenic (army) site.

Neo Petritsi, Strymon F, Plain, N=41°16'09", E=23°19'39", 55 m a.s.l. Yellow pan traps in herbaceous flatland dominated by grasses, with a very sandy substrate.

Promohonas, Mezias 1, N=41°20'52", E=23°20'32", 55 m a.s.l. This is a reasonably moist (yet not often flooded) part of the flood plain of the Strymon River, the vegetation is dominated by *Rubus* sp. and lush herbs and grasses, it is still green in September, which most of the area isn't, it is grazed by cows and so experiences some dunging pressure.

Vironia, Ramna, see the Malaise trap site above.

Pitfall traps

These traps are small, being comprised of a cup sunk into the ground and a preservative. They are mainly aimed at walking invertebrates such as beetles, millipedes, and centipedes. The killing and preserving fluid is ethylene glycol, meaning the specimens must be washed and then transferred to 70% alcohol, once they have been brought back to the lab, before they can be sorted. These traps can be left in place for a week at a time, and during 2008 each of the Malaise traps had a pitfall trap associated with it. Pitfall traps were also sited in more than 50 other locations throughout the national park for various lengths of time. Trap sites ranged from the edge of the lake to above the tree-line of the mountains (1620 m a.s.l.).

Vironia, New Trap 01, N=41°17'19.1", E=23°13'13.1", 695 m a.s.l. The biotope is a mixed deciduous forest on a mountain side, with a south east facing aspect.

Hand netting

This method involves using hand held nets, and while it is more time consuming than a Malaise trap it does allow you to catch specimens that would not otherwise be caught. The insects are then removed from the net one at a time using an aspirator. Hand netting uses a finer, light net and is used to catch insects in flight over vegetation, particularly flowers; it is less robust than a sweep net, but deeper, so that insects can be trapped within it for easier extraction, and less damaging to fragile insects such as butterflies. This method was used regularly throughout the national park.

Akitohori, Beles Mts., N=41°17'15.3", E=23°10'39.7", 420 m a.s.l., in a village.

Himmaros, N=41°07', E=23°15', in a village.

Recorded species

The localities for each species are listed alphabetically. The details are given in this order: locality, local name, trapping method (no data = Malaise trap), date of collection, number of specimens of all three castes. The material was collected by Gordon Ramel and identified by Libor Dvořák. The finds from the Kerkini wetlands are commented on in relationship to the world distribution of each species.

The Vespinae were identified using the key by ARCHER (1989), their nomenclature fol-

lows CARPENTER & KOJIMA (1997). The Polistinae were identified using the key by DVOŘÁK & ROBERTS (2006), their nomenclature follows CARPENTER (1996) with one exception – the grammatical ending of the specific name of *Polistes dominula* (see CASTRO & DVOŘÁK 2009 for an explanation).

Subfamily V e s p i n a e

***Dolichovespula media* (RETZIUS 1783)**

L o c a l i t i e s : Neo Petritsi, Farfara, 16.6.-22.6.2008, 1☿. Vironia, Beabies, Banana trap, tree 03, 14.7.-20.7.2008, 1☿. Vironia, Kerkini, wine trap, tree 3, 7.-13.7.2008, 3☿☿.

Three finds from montane (750 and 1180) forested parts nearby the Sultanitsa stream. Palaearctic species distributed from the British Isles to Japan and from southern Scandinavia to the mountains in southern Europe. It inhabits forests, parks, orchards, and bushes. The species is known to be spreading at present (see CASTRO & DVOŘÁK 2009 for a recent distribution summary). **The first record for the Greek fauna.**

***Dolichovespula saxonica* (FABRICIUS 1793)**

L o c a l i t i e s : Neo Petritsi, Sultanitsa, 14.-21.7.2008, 1♂. Vironia, Beabies, 7.-13.7.2008, 1♂; 21.-27.7.2008, 1♂.

Three finds from two montane stands (1150 and 1485 m a.s.l.). Palaearctic species distributed from the British Isles in the west to Japan in the East; it does not occur further south. ARCHER 1999 published the list of countries where *D. saxonica* occurs: Greece is on the list, but no source of the data was given (the data of this record are: northern Greece, Aspropotomas, 4700 feet, 27.7.1976, 1♂, K. Guichard leg., M. E. Archer 1977 det. et coll., checked 2009). **The first precisely located record for the Greek fauna.**

***Dolichovespula sylvestris* (SCOPOLI 1763)**

L o c a l i t i e s : Vironia, Beabies, 28.7.-3.8.2008, 1♂.

The only find is from montane (1150) mixed forest. West Palaearctic species distributed in Europe, the Middle East, and Asia to Mongolia. It occurs in light forests, gardens, bushes, and forest-steppes. Northern Greece represents one of the southernmost points of the species' distribution in Europe.

***Vespa crabro* LINNAEUS 1758**

L o c a l i t i e s : Kerkini, Krousia Mts., 10.8.2005, 1☿; 6.6.-12.6.2007, 4♀♀; 15.-21.8.2007, 1☿; 22.-28.8.2008, 2☿☿. Kerkini, Pumping St., 30.5.-5.6.2007, 1♀. Kerkini, Timber Yard, 23.5.-29.5.2007, 1♀. Neo Petritsi, Midway, 2.-8.6.2008, 2♀♀; 9.6.-15.6.2008, 1♀; 16.-22.6.2008, 1♀; 30.6.-6.7.2008, 1♀; 21.-27.7.2008, 2☿☿. Promohonas, Procom, 13.6.-19.6.2007, 1♀. Vironia, Ostrya, wine trap, tree 2, 7.-13.7.2008, 1☿.

Different biotopes at altitudes 40-750 m. Palaearctic species distributed from the British Isles to Japan. It inhabits light forests (floodplain and oak forests mostly), parks, gardens, and orchards. Northern Greece represents one of the southernmost points of the species' distribution in Europe.

Vespula germanica (FABRICIUS 1793)

L o c a l i t i e s : Akitohori, Beles Mts., 20.5.2004, 1♀. Kerkini, Kerkini Marsh, 11.4.-17.4.2007, 2♀♀; 25.4.-1.5.2007, 1♀. Kerkini, Krousia Mts., 13.6.-19.6.2007, 1♂; 11.-17.7.2007, 2♂♂; 1.8.-7.8.2007, 3♂♂; 8.-14.8.2007, 6♂♂; 15.-21.8.2007, 4♂♂; 22.-28.8.2007, 3♂♂. Kerkini, Pumping St., 2.5.-8.5.2007, 1♀; 23.5.-29.5.2007, 3♀♀; 9.5.-15.5.2007, 4♀♀; 30.5.-5.6.2007, 1♀; 13.6.-19.6.2007, 1♀. Kerkini, Timber Yard, 23.5.-29.5.2007, 3♀♀. Lithotopos, Ecotourism, 30.9.2005, 1♀; 9.5.-15.5.2006, 1♀; 23.5.-29.5.2006, 1♂; 25.-31.7.2006, 2♂♂; 8.-14.8.2006, 1♂; 15.-21.8.2006, 2♂♂; 22.-28.8.2006, 3♂♂; 5.-11.9.2006, 1♂; 12.-18.9.2006, 2♂♂; 19.-25.9.2006, 1♂; 26.9.-2.10.2006, 2♂♂. Lithotopos, Kerkini Lake, 11.4.-17.4.2005, 1♀; 9.5.-15.5.2005, 2♀♀. Neo Petritsi, Farfara, 14.-20.7.2008, 1♂. Neo Petritsi, Midway, 19.5.-25.5.2008, 1♀; 9.6.-15.6.2008, 1♀, 1♂; 16.-22.6.2008, 2♂♂; 23.6.-29.6.2008, 1♂; 30.6.-6.7.2008, 1♂; 1.9.-7.9.2008, 1♂. Promohonas, Procom, 7.4.-13.4.2008, 1♀; 23.-29.5.2007, 3♀♀; 30.5.-5.6.2007, 2♀♀. Vironia, Beles, 11.4.-17.4.2005, 1♀; 30.5.-5.6.2005, 2♀♀. Vironia, New Trap 01, pitfall trap, 20.-26.10.2008, 2♂♂.

Very common species, mainly up to 100 m a.s.l. in different biotopes. The two highest situated localities are in dry deciduous forest at 750 m a.s.l. (Midway). Xerophilous Palaearctic species known from the British Isles to Korea, northern Africa, the Middle East and northern India. Introduced into different parts of the world. It inhabits mainly open and anthropogenic stands, but it is also plentiful in light open forest in lowlands.

Vespula rufa (LINNAEUS 1758)

L o c a l i t i e s : Ano Paroia, Large Plateau, yellow pan trap at alder carr, 8.8.-13.8.2007, 1♂. Neo Petritsi, Sultanitsa, 19.5.-25.5.2008, 1♀; 7.-13.7.2008, 1♂; 21.-27.7.2008, 2♂♂; 1.9.-7.9.2008, 1♂. Vironia, Beabies, 9.-15.6.2008, 1♂; 23.-29.6.2008, 1♂. Vironia, Ramna, 16.6.-22.6.2008, 2♂♂; 23.-29.6.2008, 1♂; 30.6.-6.7.2008, 1♂; 7.7.-13.7.2008, 2♂♂; 14.-20.7.2007, 1♂; 19.7.2009, yellow pan traps, 2WW.

The four localities are in hilly and montane damp and forested areas at 630-1485 m. Holarctic forest species which can also inhabit coniferous forests. The southern European mountains represent the southern borders of the species' distribution. The only previous finds from Greece are mentioned in an unpublished dissertation by ĆETKOVIĆ 2002. **The first published records from Greece.**

Vespula vulgaris (LINNAEUS 1758)

L o c a l i t i e s : Himmaros, 21.8.2004, 1♂; 27.8.2004, 1♂, Kerkini, Krousia Mts., 1.8.-7.8.2007, 1♂. Neo Petrisi, Saga, yellow pan traps, 17.6.2008, 1♂. Neo Petritsi, Sultanitsa,2.6.-8.6.2008, 1♀; 16.-22.6.2008, 1♀; 8.9.-14.9.2008, 1♂. Promohonas, Procom, 18.-24.7.2007, 1♂. Vironia, Beabies, 8.9.-14.9.2008, 1♂. Vironia, Kerkini Mts., Banana trap, tree 02, 14.7.-20.7.2008, 9♂♂. Vironia, Kerkini, wine trap, tree 3, 23.-29.6.2008, 1♂; 7.-13.7.2008, 1♂. Vironia, Ostrya, wine trap, tree 2, 7.-13.7.2008, 2♂♂. Vironia, Ramna, 23.-29.6.2008, 3♂♂; 7.7.-13.7.2008, 2♂♂; 14.-20.7.2007, 3♂♂; 21.-27.7.2008, 4♂♂; 28.7.-3.8.2008, 1♂; 8.9.-14.9.2008, 1♂; 19.7.2009, yellow pan traps, 5WW.

Ten localities, mainly from forested areas in hilly and montane regions up to 1485 m; two sites are at lower altitudes (60 and 190 m) but also forested. Holarctic species inhabiting a wide range of stands. The southern European mountains represent the southern borders of the species' distribution.

Subfamily P o l i s t i n a e

***Polistes associus* KOHL 1898**

L o c a l i t i e s : Lithotopos, Ecotourism, 6.-12.6.2006, 1☿; 13.-19.6.2006, 1♀; 2☿☿, 20.-26.6.2006, 1♀; 4.-10.7.2006, 1☿; 11.-18.7.2006, 1♀; 25.-31.7.2006, 2☿☿; 19.6.2008, 1♀, 5☿☿, yellow pan traps. Lithotopos, Kerkini Lake, 30.5.-5.6.2005, 1☿. Megalohori, Megalohori, 18.-22.6.2008, 7☿☿, yellow pan traps. Neo Petritsi, Midway, 21.-27.7.2008, 1☿. Neo Petritsi, Sultanitsa, 14.-21.7.2008, 1♂. Promohonas, Mezias 1, 3.8.2009, 1W, yellow pan traps.

Four lowland localities, one medium-height locality, and one montane locality. Palaearctic species known from the southern half of Europe, the Middle East, and up to India and Pakistan. It prefers xeric stands. Relatively common in Greece.

***Polistes biglumis* (LINNAEUS 1758)**

L o c a l i t i e s : Ano Paroia, Camp 1777, yellow pan traps, 15.7.-27.7.2007, 1☿.

One find from a subalpine stand at 1600 m a.s.l. West Palaearctic species occurring in almost the whole of Europe, northern Africa, and the Middle East, to Mongolia and Pakistan. It inhabits open stands without any moisture preference. ĆETKOVIĆ 2002 has noted that the Greek data published by ZIMMERMANN 1931 and WEYRAUCH 1939 are erroneous. **The first verified record from Greece.**

***Polistes dominula* (CHRIST 1791)**

L o c a l i t i e s : Ano Paroia, Large Plateau, yellow pan traps at beech forest, 8.8.-13.8.2007, 1♂. Ano Paroia, Camp 1777, yellow pan traps, 15.7.-27.7.2007, 1☿. Himmaros, 16.8.2005, 1♀. Kerkini, Krousia Mts., 8.1.2005, 1♀; 27.6.-3.7.2007, 1☿. Lithotopos, Ecotourism, yellow pan traps, 19.6.2008, 1♀; 25.-31.7.2006, 1♀; 1.-7.8.2006, 2☿☿; 15.-21.8.2006, 1☿; 22.-28.8.2006, 1☿. Lithotopos, Kerkini Lake, 9.5.-15.5.2005, 2♀♀, 1☿; 13.6.-19.6.2005, 1♀; 20.-26.6.2005, 1☿. Megalohori, Megalohori, 18.-22.6.2008, 2☿☿, yellow pan trap. Neo Petritsi, Kerkini Mts., yellow pan traps, 14.6.2009, 1♂. Neo Petritsi, Midway, 28.7.-3.8.2008, 1☿. Neo Petritsi, Roupel's Gorge, yellow pan traps, 7.6.2009, 1☿. Neo Petritsi, Stentori, Kerkini Mts., yellow pan traps, 14.6.2009, 2♀♀. Neo Petritsi, Strymon F, Plain, yellow pan traps, 21.5.2009, 1♀. Neo Petritsi, Sultanitsa, 14.-21.7.2008, 1♀; 28.7.-3.8.2008, 2♀♀. Promohonas, Procom, 20.6.2008, 1☿, yellow pan trap.

Recorded from a wide range of stands (14 sites): open sites, forests, bog, subalpine vegetation, and from 38 to 1600 m a.s.l. Palaearctic species inhabiting almost the whole of Europe, northern Africa, and a large part of Asia. Introduced to Australia, Patagonia, and North America. A very common species everywhere in Greece.

***Polistes gallicus* (LINNÉ 1767)**

L o c a l i t i e s : Lithotopos, Kerkini Lake, 25.4.-1.5.2005, 1♀; 30.5.-5.6.2005, 1☿; 13.6.-19.6.2005, 2☿☿; 20.6.-26.6.2005, 2☿☿; 16.5.-22.5.2005, 2☿☿. Megalohori, Megalohori 2, yellow pan traps, 24.8.-29.8.2008, 1♂. Promohonas, Procom, 4.-10.7.2006, 1☿.

Recorded from three lowland sites, up to 75 m a.s.l. from various, more or less xeric stands. Palaearctic species known from the southern half of Europe, northern Africa, the Middle East and central Asia to Mongolia and China. A very common xerophilous species in Greece.

***Polistes nimpha* (CHRIST 1791)**

L o c a l i t i e s : Lithotopos, Ecotourism, 8.-14.8.2006, 1☿. Megalohori, Megalohori, 18.-22.6.2008, 1☿, yellow pan trap. Neo Petritsi, Sultanitsa, 14.-21.7.2008, 1♂, 1☿. Promohonas, Mezias 1, 3.8.2009, 1W, yellow pan traps.

Surprisingly rare in the Kerkini wetlands. Three lowland (65, 55, and 38 metres) finds from open sites with grazed shrubs, and one montane (1485 m) find from a bog. Relatively common in Greece.

***Polistes sulcifer* ZIMMERMANN 1930**

L o c a l i t i e s : Ano Paroia, Camp 1777, yellow pan traps, 15.7.-27.7.2007, 2♂♂. Neo Petritsi, Sultanitsa, 6.-12.10.2008, 1♀.

Two males and one female from subalpine stands at 1600 and 1485 m a.s.l. Rare social parasite with circummediterranean distribution northwards to Central Europe and eastwards to Iran. Only a few published records are known from Greece.

Acknowledgments

The authors wish to thank Fritz Gusenleitner (Museum of Upper Austria, Linz, Austria) for help with the final preparation of the manuscript and for the German translation, as well as Theodoros Naziridis, of the Wetland Kerkini Management Authority, for facilitating this study, the Taxonomic Museum of Gembloux (via Guido Van de Weyer) for supplying the first two Malaise traps and the BMNH, London, (via Max Barclay) for supplying a second two Malaise traps. We wish also to thank Michael E. Archer (York St. John University College, England) for the data to his find of *Dolichovespula saxonica* and to Leopoldo Castro (Terruel, Spain) for very helpful comments to the manuscript).

Zusammenfassung

Vorliegende Studie beschäftigt sich mit der faunistischen und ökologischen Erforschung der sozialen Faltenwespenfauna des griechischen Nationalparks, einschließlich des Sees Kerkini, besser bekannt unter dem Namen "Feuchtgebiet Kerkini". Vorliegender Nationalpark ist der größte Griechenlands mit unterschiedlichsten Habitaten, die nicht alle in dieser Arbeit Berücksichtigung finden konnten. 13 Faltenwespen aus vier Gattungen konnten nachgewiesen werden, vier davon neu für Griechenland: *Dolichovespula media*, *D. saxonica* als erster sicherer Nachweis für Griechenland und südlichster Verbreitungspunkt in Europa, *Vespula rufa* als erster publizierter Nachweis für Griechenland, bekannt bisher nur aus einer unpublizierten Dissertation und südöstlichster Verbreitungspunkt in Osteuropa sowie *Polistes biglumis* als Erstnachweis Griechenlands.

References

ARCHER M.E. (1989): A key to the world species of the Vespinae (Hymenoptera). — Research monograph of the College of Ripon and York St John **2** (1): 1-41, **2** (2): 1-34.

ARCHER M.E. (1999): Taxonomy and world distribution of the Euro-Asian species of *Dolichovespula* (Hym., Vespidae). — Entomologist's Monthly Magazine **135**: 153-160.

BLÜTHGEN P. & J. GUSENLEITNER (1970): Faltenwespen aus Griechenland (Hym., Diploptera). — Mitteilungen aus dem Zoologischen Museum in Berlin **46** (2): 277-298.

CARPENTER J.M. (1996): Distributional checklist of species of the genus *Polistes* (Hymenoptera: Vespidae; Polistinae; Polistini). — American Museum Novitates **3188**: 1-39.

CARPENTER J.M. & J. KOJIMA (1997): Checklist of the species in the subfamily Vespinae (Insecta: Hymenoptera: Vespidae). — Natural History Bulletin of Ibaraki University **1**: 51-92.

CASTRO L. & L. DVOŘÁK (2009): New and noteworthy records of vespid wasps (Hymenoptera: Vespidae) from the Palaearctic region (II). — Boletín Sociedad Entomológica Aragonesa **44**: 295-304.

ĆETKOVIĆ A. (2002): Diverzitet faune socijalnih osa (Vespinae et Polistinae, Vespidae, Hymenoptera) Balkanskog poluostrva i susednih regiona – biogeografski i taksonomski aspekti. [Diversity of the social wasps of the Balkan Peninsula and the adjacent regions – biogeographical and taxonomic aspects (Vespinae et Polistinae, Vespidae, Hymenoptera)]. — Ph.D. Thesis, Faculty of Biology, University of Belgrade, 331 pp. (in Serbo-Croatian, English abstract).

DVOŘÁK L. & S.P.M. ROBERTS (2006): Key to the paper and social wasps of Central Europe (Hymenoptera: Vespidae). — Acta Entomologica Musei Nationalis Pragae **46**: 221-244.

ERLANDSSON S. (1974): Hymenoptera Aculeata from the European parts of the Mediterranean countries. — Eos **48** (1972): 11-93.

LECLERCQ J. (1956): Mission E. Janssens et R. Tollet en Grèce (Juillet-août 1953). 14^{e} Note. Hymenoptera – Sphecidae et Vespidae. — Bulletin et Annales de la Société Royale Entomologique de Belgique **92**: 324-327.

WEYRAUCH W. (1939): Zur Systematik der paläarktischen Polistinen auf biologischer Grundlage. — Archiv für Naturgeschichte, B, N.F., Leipzig, **8**: 145-197.

ZIMMERMANN K. (1931): Studien über individuelle und geographische Variabilität paläarktischer *Polistes* und verwandter Vespiden. — Zeitschrift für Morphologie und Ökologie der Tiere **22**: 173-230.

Authors' addresses: Libor DVOŘÁK
Municipal Museum Mariánské Lázně
Goethovo náměstí 11
CZ-35301 Mariánské Lázně, Czech Republic
E-mail: lib.dvorak@seznam.cz, dvorak@muzeum-ml.cz

Gordon RAMEL
Information Centre of Wetland Kerkini
Kerkini, GR-Kato Paroia 62055, Serron, Greece
E-mail: mrgordonramel@yahoo.com

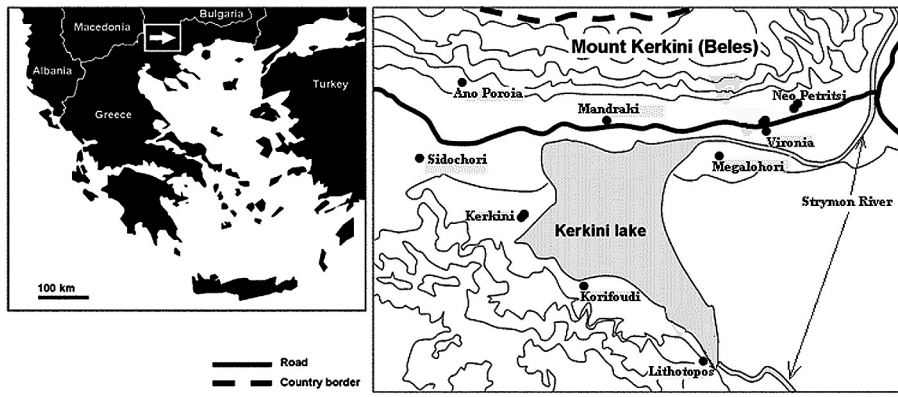

Fig. 1: A schematic map of Wetland Kerkini and its position in Greece.