

Project Update: October 2018

During June, July and August 2018 we conducted most of the planned field work. First trip was to Mtn. Mokra Gora, part of the Prokletije massive, where the main objective was to locate the last population of Balkan pine (*Pinus peuce*) in Serbia and collect parasitoid samples associated with this Balkan endemite.



Left: Only population of Balkan pine in Serbia. Right: Searching for aphids on Balkan pine.



Left: Conifer aphids, attended by ants. Right: *Monochamus* sp. in Arbinje, Stara Planina.

Sampling was successful, as the population was heavily infested with aphids and aphid parasitoids. Next locality was Mtn. Golija, part of the UNESCO registered biosphere reserve, Golija-Studenica Biosphere Reserve. We collected samples from Norway spruce (*Picea abies*), European fir (*Abies alba*) and common juniper (*Juniperus communis*). Weather conditions on Golija were not favourable, with lots of days with heavy rain, so we had to make two separate field trips to this mountain. After that we sampled on Mtn. Kopaonik, the largest mountain

range in Serbia. Kopaonik is mostly covered in spruce, so the majority of samples from this locality are from this widely spread conifer. Next locality was Mtn. Tara, with the most preserved forests of spruce and fir in Serbia. Tara is also the only locality where Serbian spruce (*Picea omorika*), a tertiary relict, can be found.



Left: Aphid mummy. Right: Bark beetle activity.

Serbian spruce populations are in decline and most localities are now home to just a few very old trees, with no rejuvenation of populations. For this reason, the branches of the old trees are virtually impossible to access, and the few that we could reach showed no signs of aphid or parasitoid activity. The Tara National park rangers regularly monitor the Serbian spruce populations, and they agreed to collect aphid samples if they find any and to help us with additional equipment next year if needed. After Tara, we sampled on the Zlatar Mountain. Unfortunately, the weather on Zlatar was similar as on Golija, with almost non-stop heavy rain. Some samples were collected, but this locality will also probably require another trip next year. However, the neighbouring Mtn. Murtenica (which some consider a part of Zlatar, and some a mountain on its own) is the home of another Balkan endemite, the Heldreich's pine (*Pinus heldreichii*). This is its last population in Serbia, comprising of only ten trees, and we managed to find parasitoid samples on five of them. The last sampling site was Mtn. Stara Planina in South-eastern Serbia, rich with water and intersected with rivers and streams in most parts. This trip was very successful, and we collected numerous samples from different conifers.



Left: *Pinus sylvestris*. Right: Poor condition of Serbian and Norway spruce forest.

The conditions of conifer forests varied between localities. Tara seems to be the locality with the most preserved forests, while conifer forests on Kopaonik show more signs of decline. This may be due to the fact that Tara forests are mostly mixed, comprising of fir and spruce, and as such are more successful in resisting pests. However, on Tara, especially in the forests where Serbian spruce is present, we noticed numerous signs of bark beetle activity, and the park rangers are aware of this problem. Kopaonik forests, on the other hand, are mainly just spruce forests, and as a kind of monoculture, more susceptible to pest damage. Balkan pine forest in Mokra Gora is a nature reserve and it is in good condition. The biggest problem in this part is the unlawful cutting down of forests, due to political disputes in the area surrounding the state borders. Old forests in Murtenica are in good condition, mainly because of little or no human interference and because of the mixed taxonomic composition. Conifers in Golija show some signs of decline, while forests in Stara planina are generally not in bad shape. On mountain Stara planina we noticed large number of trees that casted needles in the upper part of the branch, while the rest of the tree looked healthy. We took samples and photos and will consult botanists about this problem.

We established contact with authorities in all visited areas, whether it was with the National park rangers, forest management or the police. We had help from the forest management in finding specific localities that aren't marked with hiking trails, especially in the areas around state borders.



Spruce forest on Ponor, Prokletije massive.



Left: *Pinus heldreichii* one of the 10 remaining trees in Serbia. Right: Arbinje, mixed forest of spruce and fir.



Left: Stara Planina Mountain. Right: Kopaonik.



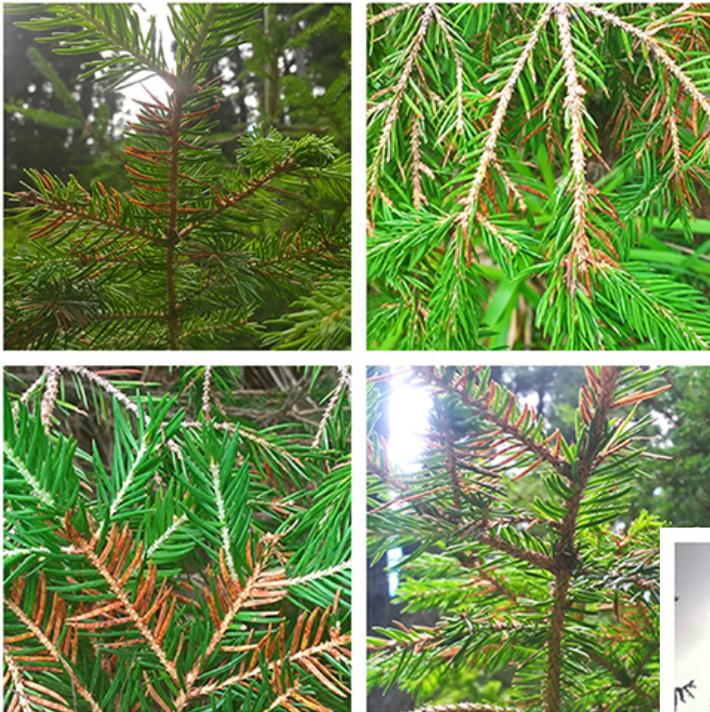
Left: Stara planina, on the border with Bulgaria. Right: Jankov kamen, Golija.



Left: *Juniperus communis* on Stara Planina. Right: Location Pogled, part of Prokletije massive, home to *Pinus peuce*.



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Needle casting on spruce in Arbinje, Stara planina.

Picea omorika on Tara Mountain.

