

Mosses – tough guys in hard conditions.

Mark Stoop

During the winter when the ground is covered with snow and the temperature below zero, not many students would think about going out in the forest to do some research. Most people think that there is nothing to investigate because there are no leaves on the trees and most animals are hibernating during the winter. Since there is so little known about winter processes in general it is difficult to predict future responses to climate changes. Almost all our knowledge about winter ecology is based on arctic and alpine regions. Much less is known about winter ecology in boreal regions and even less is known about mosses during winter. My study revealed that the mosses can start to grow directly after snow melt, and that their complete recovery is very fast.

In order to get more knowledge about winter ecology and especially of mosses, several forest moss species were investigated to see how their photosynthetic machinery recovers after snow melt in spring. The photosynthetic machinery is the part of a plant that uses light to bind carbon dioxide in order to grow. The mosses had been under a thick snow cover for several months; thick enough to not allow any light to penetrate down to the mosses. Hence they would not be able to perform photosynthesis and therefore I assumed that the photosynthetic apparatus would be degrading over winter.

To investigate this recovery six moss species were collected. I measured how much carbon dioxide the mosses could take up in light to see how good the status of the photosynthetic machinery was after the winter period. In darkness the respiration rate was measured to see if it was different from normal conditions. After those measurements the mosses were put inside a greenhouse to see if the recovery was better in the greenhouse than after the same period outside in the field. After a month another set of mosses was collected in the field and had the same measurements as the first set. Also the mosses from the greenhouse were measured again to compare the recovery from the greenhouse and from the field.

The results from this experiment were surprising. The mosses did show some kind of recovery of the photosynthetic machinery although both after recovery in the greenhouse and in the field. So it seems that the recovery follows the same pattern under different conditions. Another discovery was that there is a general recovery process in the mosses since all the moss species followed the same pattern. The most interesting discovery was that, the mosses that were collected from under the snow already had some basic level of activity and that they recovered almost totally in just four weeks after they were dug up from under the snow. So it seems that mosses can maintain their photosynthetic ability throughout the winter under a very thick snow layer. These little organisms have more potential than you think when you first set your eyes on them. They are really tough guys under harsh conditions.

Degree project in Biology, Bachelor of Science, 2010

Examensarbete i biologi 15 hp till kandidatexamen, 2010

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