In this thesis I focus on different aspects of two basic types of peatlands – ombrotrophic bogs and minerotrophic fens, that differ in the source of their water supplies. In case of the bogs, all the moisture comes from precipitation, the fens are in varying degrees supplied with water from the mineral soil and bedrock. This concept is based on the assumption that hydrological conditions are essential for other properties of acidic wetlands, especially for vegetation, which is still the subject of discussion. Therefore I mention different gradients of peatlands (pH, nutrients and minerals) and important processes (succession, accumulation of peat) with regard to their relation to minerotrophy and ombrotrophy and I discuss their importance for the entire ecosystem. In the second part of my thesis, I focus on the algal assemblages in peatlands, which despite its immense diversity often form a neglected component of these ecosystems. The structure of algal communities vary in space and time under the influence of various factors, including, among others, ombrotrophy and minerotrophy.