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**MACROPHYTE COMMUNITIES IN UN-IMPACTED EUROPEAN  
STREAMS: VARIABILITY IN ASSEMBLAGE PATTERNS, ABUNDANCE  
AND DIVERSITY**

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Macrophytes are one of the biological quality elements to be included in an integrated description of the ecological status of flowing waters under the European Union Water Framework Directive (WFD). However existing knowledge on macrophyte assemblage patterns in un-impacted European streams and rivers is limited and several problems may therefore arise regarding their assignment to ecological quality classes. In the present paper we investigated community structure i.e. composition, richness and diversity measures in 60 un-impacted stream and river sites situated throughout Europe. We found that the macrophyte community structure varied considerable among the main stream types. Moving from the small streams in upland areas (core stream type 1) to middle-sized lowland streams (core stream type 2) there was a clear transition in species richness, diversity and community structure. Especially there was a shift from a predominance of species poor mosses and liverwort dominated communities in core 1 sites to more species rich communities dominated by vascular plants in core 2 sites. We found that the macrophyte communities responded to most of the features underlying the typological framework defined in WFD. However our results raise the question whether the previous translation of the WFD typology is adequate for an evaluation of stream quality based on macrophytes. First, by using this typology we may overlook an important community type, that is characteristic of small-sized relatively steep-gradient streams being an intermediate type between core 1 and core 2 streams. Second, the natural variability in most of the calculated metrics is higher when using the pre-defined typology. This implies that we may improve our ability to detect impacts in streams and rivers by refining the typology to more adequately describe the macrophyte communities.