**Hydrological connectivity promotes coalescence of bacterial communities in a floodplain**

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Floodplains play essential roles in the ecological functions of regional environments. The merging and coalescence of bacterial communities in aquatic environments results in periodic patterns driven by regular hydrological activities, which may, in turn, influence ecological activities. However, the degree of bacterial community coalescence in the lateral and vertical directions as well as the underlying hydrological mechanism of floodplain ecosystems is poorly understood. Therefore, we investigated the spatiotemporal patterns and coalescence processes of planktonic and sedimentary bacterial communities during normal and high-water periods in a floodplain ecosystem of the Yellow River source region. We classified bacterial operational taxonomic units (OTUs) based on 16S rRNA gene sequencing, and quantified community coalescence by calculating the proportions of overlapping OTUs, the contributions of upstream sources to downstream sinks, and positive/negative cohesion. The results revealed major differences in the composition and diversity of planktonic and sedimentary bacterial communities. Bacterial community diversity in the high-water period was higher than in the normal period. Laterally, hydrological connectivity promoted the immigration and coalescence of bacterial communities to oxbow lakes in both the mainstream and tributaries, with the coalescence degree of planktonic bacteria (2.9%) higher than that of sedimentary bacteria (1.7%). Vertically, the coalescence degree of mainstream planktonic and sedimentary bacterial communities was highest, reaching 2.9%. Co-occurrence network analysis revealed that hydrological connectivity increased the complexity of the bacterial network and enhanced the coalescence of keystone species to oxbow lakes. Furthermore, community coalescence improved the competitiveness and dispersal of bacterial communities. This study demonstrated that coalescence of bacterial communities is driven by hydrological connectivity in a floodplain ecosystem. Further studies should investigate the processes of bacterial community coalescence in floodplains in more detail, which could provide new approaches for environmental protection and ecological function preservation.