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Response of spatial distribution of phosphorus in soil to wetlands restoration in Yellow River

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Introduction Phosphorus can notably influence the productivity and reflect the level of nutrition in wetland .The contents of phosphorous were influenced by many factors such as soil depth , submerging conditions , salt contents and other nutrients (Guo ,2000) , and reversely influenced the salinity and the distribution of other nutritive elements . Phosphorous was also concerned as one of the major elements related to degeneration of wetland ecosystems (Kuo ,2005) . In order to clarify the response of spatial distribution of phosphorus to the restoration of wetlands , the different spatial distributions of phosphorus in soil profiles before and after recovery were studied in this paper mainly .

Materials and methods This study was conducted at Yellow River Delta (YRD ,37°35' to 38°12'N ,118°33' to 119°20') ,which is located on the west coast of Bohai Sea ,Shandong province . In May and June of 2005 ,8 sampling sites were selected both in restored site and the control site . Soil profiles were stratified for sampling at intervals in a total of 70cm depth as follows : 0-10cm ,10-20cm ,20-40cm ,40-70cm . The soil sample were randomly collected from 5 spots according to their depth in each sample plot and mixed well . All soil samples were analyzed by using standard methods .

Results and discussion The contents of phosphorus were comparatively low in both regions (0.356-0.691g/kg) . The phosphorus contents in restored site were higher , while the variation in the control site was larger . The phosphorus contents in surface soil were obviously lower than other layers . Among soil profiles , the significant variation was observed on the middle layer soil , while no significant difference was found on other layer soil g . After restoration , the surface soil was submerged under water , this inundation enhanced the leach of phosphorus . After inundation , the pH values and Fe contents in soil profiles increased . Those increases resulted in the increased fixation of soil , leading to decreased release and validity of phosphorus . This is why the phosphorus contents of in the underground layer soil (10-20cm ,20-40cm) from restored site were slightly higher than the control . The correlation analysis among total P , pH , salt content and soil moisture in both sites showed that the contents of phosphorus had positive correlation with pH and negative correlations with both salt content and soil moisture .

Conclusion The results obtained from this study that contents of phosphorus were higher and more stable in submerging condition confirm that wetlands restoration can enhance the leaching process of rainwater or surface pond water , increase soil fixation , lower the release and depress the validity of phosphorus . Wetlands restoration is the accumulation of phosphorus .

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