



Warming enhances nitrogen uptake by winter wheat under two tillage systems

Ruixing Hou

Institute of Geographic Sciences and Natural Resources Research, Beijing, China (hourx@igsnr.ac.cn)

Despite the perceived importance of N to wheat growth and production, few studies have attempted to examine the effects of warming on wheat N uptake pattern or its preference for NO_3^- -N, NH_4^+ -N, especially under different tillage systems. In the North China Plain, an *in situ* ^{15}N labelling study was conducted on winter wheat in which effects of experimental warming during the jointing stage under till and no-till tillage systems on uptake of total N and three forms of N (NO_3^- -N, NH_4^+ -N and glycine-N) was studied. Warming strongly enhanced wheat biomass and N content in both roots and shoots. Total N uptake rates increased by 40% and 47% under till and no-till treatments, respectively. Warming changed the uptake pattern of the three forms of N by significantly increasing the contributions of NO_3^- -N and glycine-derived N, while decreasing the contribution of NH_4^+ -N. Between the two tillage systems, wheat under no-till without warming obtained more N than till. However, warming was found to suppress N uptake under no-till relative to till. Collectively, high temperatures accelerate N sequestration in winter wheat and improve the preferential contribution of NO_3^- -N due to high soil N availability and enhanced microbial activity.