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The regulating role of Mo, Zn, Mn, B contents for the barriers in soybean continuous cropping system in Northeast China

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The regulating role of Mo, Zn, Mn and B on soybean yield under stress conditions caused by soybean continuous cropping system (SCCS) based on pot experiment and field experiment was considered. The results indicated that the contents of available Mo and B in pre-sowing soil under different soybean continuous cropping years were lower than that under soybean rotation system (SRS). The fluctuate trend of available Mo and its accumulation characters in different growth stages under SCCS were similar with those in SRS, however, the content of Mo was lower compared with that in SRS. The content of available Mo within SCCS was decreased and close to the critical value ( $0.1\text{mg kg}^{-1}$ ) in full blooming stage, and even much lower in podding stage. The content of available Zn in soil under SCCS was totally higher but the uptake and accumulation of Zn in soybean plant was lower than that in SRS, the variation was especially significant in the critical full blooming–podding–seed filling stage. Mo, Zn, Mn contents of plant in different growth stages were correlated significantly with N and P contents of plant. Mn content of plant was correlated significantly with polyphenol oxidase activity at branching stage. Mo content in soybean plant at podding stage was correlated significantly with nitrogen fixation of root nodule, nitrogen content of plant and yield. Zn and Mn contents of plant at the blooming and podding stages was correlated significantly with yield. The regulating role of Mo, Zn, Mn, and B could promote the soybean growth, increase the yield and alleviate the barriers under continuous soybean cropping system.