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沟灌方式和水氮对玉米产量与水分传导的影响

Effects of different furrow irrigation patterns, water and nitrogen supply levels on hydraulic conductivity and yield of maize

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中文关键词: [灌溉](#) [氮](#) [水分](#) [根系及冠层水导](#) [产量](#) [植株氮](#) [玉米](#)

英文关键词: [irrigation](#) [nitrogen](#) [moisture](#) [root and shoot hydraulic conductivity](#) [yield](#) [nitrogen accumulation in plant](#) [maize](#)

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中文摘要:

采用正交试验设计,用美国Dynamax公司生产的高压流速仪(High Pressure Flow Meter,简称HPFM)的瞬时法原位测定大田玉米拔节期、抽雄期和蜡熟期的根系及冠层水分传导(简称根及冠层水导),研究了不同沟灌方式、灌水量和施氮量对玉米水分传导、产量和植株氮的影响。结果表明,玉米根系或冠层水导最大值均在拔节期取得,均随生育期的推移逐渐变小。通过对玉米产量和水分传导综合比较得出最优组合处理是隔沟交替灌(简称交替沟灌)中水高肥:即沟灌方式为交替沟灌、灌溉量为282mm、施氮量为240 Kg?hm-2的处理。可见,交替沟灌在根区两侧反复的对干燥侧根系进行灌水,促进根系和冠层水导增大,提高了根系对水肥的吸收利用和传输效率,使得植株氮含量较高,产量较大。

英文摘要:

Effects of different furrow irrigation patterns, water and nitrogen supply levels on hydraulic conductivity and yield of maize were studied by orthogonal experiment design. Hydraulic conductivity of maize root and shoot was measured for stage of shooting, heading and late filling by transient method with High Pressure Flow Meter (HPFM) developed by Dynamax Corporation in USA in the maize field. The results showed that maximum root and shoot hydraulic conductivity was obtained in stage of shooting, its value was gradually smaller along with growing stage. The optimal combination was obtained by the yield and hydraulic conductivity of maize in this experiment, which the relative furrow irrigation patterns was alternate partial root-zone furrow irrigation pattern and the irrigation quota was 282mm, and the quantity of supply nitrogen was 240 kg?hm-2. It is obvious that alternate furrow irrigation repeating watering for growing root in drying rootzone, promoting root and shoot hydraulic conductivity increased, water fertilization use and transport efficiency improved, and higher nitrogen accumulation in plant and yield of maize was obtained.

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