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蓄水坑灌条件下复水对水氮运移规律的影响

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摘要: 为了明确灌后复水(降水)对土壤中水氮分布的影响以及选择合理的灌施方式,通过室内模型试验,研究了在蓄水多坑肥灌条件下不同降水量(30.624, 37.334, 43.56 mm)所对应单坑不同复水量(140.1, 228.7, 400.5 mm)和不同复水时间(灌后 1, 5, 10 d)对土壤水氮运移的影响. 研究表明:复水后土壤含水率增大,复水量为 228.7 mm 及以上时,30~80 cm 深度范围内土壤含水率均达到田间持水率的 80% 以上,且复水量越大或复水时间间隔越短,复水后水分分布越均匀;硝态氮在湿润锋处积累明显,复水后坑壁附近土壤硝态氮质量浓度降低,硝态氮质量浓度峰值向远处推进,复水量越大或复水时间间隔越短,硝态氮推进越远且向深处迁移越明显;复水后铵态氮质量分数在近坑处降低,在距坑较远处增加,但变化幅度均不大,复水量越大,或复水时间间隔越短,对铵态氮质量浓度影响越大,复水后土壤铵态氮分布越均匀.

关键词: 蓄水坑灌;复水;水氮运移;硝态氮;铵态氮

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Effect of rewater on transport of water and nitrogen under water storage pits irrigation

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Abstract: In order to clarify the effect of rewatering after irrigation (rainfall) on transport of water and nitrogen, as well choose a reasonable way of irrigation methods, by means of indoor model test, the impact of the different rewatering volume (140.1, 228.7, 400.5 mm) and different rewatering interval (1, 5, 10 d after irrigation) on the migration of water and nitrogen was studied. The results show that the soil moisture content increases after rewatering. When the rewater volume is up to 1.73 L, the range of 30-80 cm depth soil moisture rate can reach more than 80% of the field capacity. The more rewatered or the shorter the interval time of rewatering was, the more uniform the moisture content distribute can be obtained. Nitrate has features of migrating with the soil water movement easily and accumulating at the wetting front. The nitrate nitrogen's concentration of the soil near the pit wall reduces after rewatering, and the peak of nitrate nitrogen's concentration is to the far forward. The more rewatering or the shorter the interval time of rewatering is, the farther nitrate nitrogen can be transported. The ammonium nitrogen of the soil near the pit wall decreases slightly, while the ammonium nitrogen of the soil far from the pit has a slight increasing. The more rewatering or the shorter the interval time of rewatering is, the larger the effect on ammonium nitrogen concentration can be obtained and the more

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