

## 半干旱地区沟垄微型集雨种植马铃薯最优沟垄比的确定

### Optimum ratio of ridge to furrow for planting potato in micro-water harvesting system in semiarid areas

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中文摘要:

采用沟垄微型集雨种植马铃薯, 垄作为集水区, 沟作为种植区, 采用三种沟垄比和两种下垫面材料。在2001~2002年的试验中, 膜垄种植马铃薯平均水分利用效率分别是对照的2.8倍(2001)和2.4倍(2002), 土垄种植马铃薯水分利用效率和对照相差不大; 由于降雨量和降雨高峰期出现时段的不同, 虽然使2001~2002年度沟垄微型集雨种植马铃薯产量有所差异, 但在两年试验中, 马铃薯增产趋势基本一致, 膜垄种植马铃薯产量分别比对照平均提高231%(2001)和153%(2002), 土垄种植马铃薯产量分别比对照平均提高58%(2001)和23%(2002)。通过直线回归分析, 在半干旱地区膜垄种植马铃薯最佳沟垄比为60 cm:40 cm, 当沟垄比为60 cm:40 cm马铃薯产量的期望值可以达到最大, 该技术是适合于半干旱地区的能较好提高降水利用率和产量的一种种植方式。

英文摘要:

The ridge and furrow micro-water harvesting(RFMH) system was developed by scientists in Gansu Province over a decade ago, which was designed to increase water available for crops for higher and more stable agricultural yield on rainfed lands under semiarid condition. In the experiment there are three ridge-furrow ratios and two pad materials. The ridges covered with plastic film and ridges compacted with soil serve as rainfall harvesting zones, and furrows serve as planting zones. The field experiment(potato as an indicator crop, because potato is popular and suitable in the study region) was conducted to determine the effects of different ridge-furrow ratios and different pad materials on tuber yield and water use efficiency(WUE) in the RFMH system during the growing seasons of 2001 and 2002. The experimental results showed that the ridge-furrow ratio and pad material had significant effects on tuber yields and WUE. The WUEs in ridges covered with plastic film were 2.8 times as high as that of the controls in 2001 and 2.4 times in 2002, respectively. No differences were found in WUE between ridges compacted with soil and controls. Although the tuber yields are different because of precipitation in 2001 and 2002, the increases of tuber yields have the similar tendency. On the average the tuber yields in ridges covered with plastic film increased by 231% in 2001 and by 153% in 2002 compared with those of the controls, and the tuber yields in the ridges compacted with soil increased by 58% in 2001 and by 23% in 2002 compared with those of the controls. By straight line regression analysis, the optimum ridge-furrow ratios for ridges covered with plastic film were 60 cm:41 cm in 2001 and 60 cm:39 cm in 2002, respectively. Through two years' field experiments, the optimum ridge-to-furrow ratio was 60 cm:40 cm for plastic-covered ridge in the semiarid areas in Loess Plateau of Northwest China.

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