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A brief introduction on water conservation and drought resistance technique on desert grassland slope

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Key words desert grassland; slope; water conservation; water conservation polymer; drought resistance polymer

Introduction As one of the greatest environmental threats, drought is paid increasingly close attention (Zhang H L, 1997). When it is affected by drought, vegetation on desert grassland's surface will be degenerated much more seriously, once it is degenerated, it is difficult to recover. Further more, slope vegetation in desert grassland belongs to a sort of soil water limited ecological system and is a sensitive area in vegetation degeneration. Therefore, desert grassland slope water conservation technique is urgently demanded.

Research method and content Firstly, an experiment area is enclosed on desert grassland slope. Based on slope rainfall-runoff (SRRO) experiment, research on SRRO characteristics on desert grassland is conducted. Based on theory of SRRO hydrodynamics, research on SRRO law is carried out. Runoff energy consuming process is analyzed. The slope soil infiltration and evaporation law is studied. The experiment of how soil structural characteristics have an effect on soil infiltration and evaporation is made. Model Green-Ampt is settled to simulate soil infiltration process. Slope water conservation method experiment is made according to the results mentioned above. The methods include increase on soil surface rough degree; application of water conservation polymer on loosened slope surface.

Secondly, on the premise of slope water conservation, drought resistance and water economization are studied. Plant population and community characteristics are analyzed. Research on each sort of plant's transpiration rate and osmosis adjustment during onset of drought stress is conducted. Synthesize the above results, drought resistance method experiment is carried out.

Drought resistance methods mainly include inhibiting growth of fast-transpiration plant; application of vegetation drought resistance spray etc, which are to reduce the transpiration rate of vegetation community. In the end, a comprehensive system of desert grassland slope is built up.

Result The study on water conservation (WR) and drought resistance (DR) under desert grassland slope conditions is carried out, and WR and DR comprehensive technique measures are put forward. As to slope WR, by method of soil loosening; application of Handilong (water conservation polymer); surface cover in winter, soil infiltration rate is increased. SRRO is increased for 6% under similar conditions. As to slope DR, owing to the application of vegetation drought resistance spray and uprooting of vegetation with high transpiration rate, plant community's transpiration rate is effectively reduced. Thus, the objective of vegetation drought resistance is obtained.

Reference

Zhang Hailun, China flood and drought disaster M. Beijing: China water irrigation and water electricity Press, 1997. 359.