LUPINE PUBLISHERS

Current Investigations in Agriculture and Current Research

DOI: 10.32474/CIACR.2023.10.000345

ISSN: 2637-4676

Opinion

New stage of Agriculture development, Agriculture high quality production

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Received: April 17, 2023 **Published:** April 24, 2023

Keywords: Soil water resources; Soil desiccation; Soil degradation; crop failure; maximum infiltration depth, soil water resources use limit by plant; water carrying vegetation capacity; the critical period of plant soil relationship regulation; sustainable use of soil water resources; high quality production

Introduction

At the original Agriculture stage, the population is smaller. People live on picking up wild fruit and the rate of resources use level is low. The point of original Agriculture stage into the yield and quality increasing stage is the domestication of wild plant for high yield and better quality. In the yield and quality increasing stage, most of old forest become into non-native vegetation, such as forest, grass, fruit, and crops. At this stage, people use excellent plant species or varieties, apply chemical fertilizer and pesticide and irrigate and so on，to increase the plants yield and quality. Due to a large number of excellent plant species or varieties in the production and cultivation process of artificial vegetation, there are unscientific phenomena such as over application of chemical fertilizer and spoiled use of pesticides, which are prone to overload leading to soil degradation, vegetation decay and crop failure or underloading leading to resource waste and environmental pollution, and cannot obtain maximum yield and benefits to meet people's yearning for a better life and agricultural needs. Agricultural production cannot efficiently produce plant products and services to meet people's needs. However, because crop land changes alter the plant resources relationship, resulting in soil degradation, vegetation decline and crop failure or waste of resources, both are unfavorable for the sustainable utilization of nature resources and crops high-quality production. Therefore, it is necessary to select excellent species or varieties on the basis of existing agriculture, adopt appropriate initial planting density, and regulate the relationship between plant resources in the process of crop production in a timely and appropriate amount, to obtain the maximum yield and benefits, realize the sustainable utilization of natural resources and achieve high quality agricultural production.

Now we enter Agriculture high quality production. The theory foundation of Agriculture high quality production is are resources use limit by plants and vegetation carrying capacity, which includes the spaces resources use limit by plants and spaces vegetation carrying capacity in soil water and soil nutrient enough regions; soil nutrient resources use limit by plants and soil nutrient vegetation carrying capacity in water limited regions in water limited regions and the Soil Water Resources Use Limit By Plants (SWRULP) and Soil Water Vegetation Carrying Capacity (SWVCC) . For example, in the water-limited region, the SWRULP is the soil water resources in the Maximum Infiltration Depth (MID) in which the soil water content in every soil layer equal to wilting coefficient. The wilting coefficient is expressed by the wilting coefficient of indicate

plant in a plant community. SWVCC is the population or density of indicator plants in a plant community when the soil water supply is equal to soil water consumption in the root zone in the CPPSRR, which changes with plant community type, site condition and time(Guo et al,2002[1-12]; Guo and Shao, 2003, 2013; Guo 2004,2014,2019,2021). When soil water resources in the MID is lower than SWRULP, the plant water relation enters the Critical Period of Plant Soil Relationship Regulation (CPPSRR)（Guo 2019, 2021 [6,7]. The ending time of CPPSRR is the ineffective time. If present plant density is more than SWVCC in the critical period of plant soil relationship regulation, plant soil relationship must be regulated based on SWVCC to get the maximum yield and service. For fruit trees or crops, the relationship between vegetative growth and reproductive growth should be re-regulated according to the suitable leaf when the present density in the critical period of plant resource relationship regulation is equal to the vegetation carrying capacity, and the leaf and fine fruit relationship to obtain the maximum yield and benefits. With these procedures, sustainable use of resources, high-quality development of plantation and grass land and the high-quality production can be achieved.

Acknowledgements

This project is supported by the National Science Foundation of China (No: 41271539,41071193).

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DOI: 10.32474/CIACR.2023.10.000345