



TOTAL WATER CONSUMPTION OF SOY BEAN CROP VARIETIES AND WATER USE ON YIELD UNIT

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ABSTRACT

The study of total water consumption of soy bean on pre-irrigation soil moisture in experimental field showed that total water consumption was average 6248 m³/ha in 3 years in the variants (1, 4, 7, 10) where pre-irrigation soil moisture proportion was 70-70-70 % to limited moisture capacity (LMC) during the growth period of plant, while in the variants (2, 5, 8, 11) where pre-irrigation soil moisture proportion was 70-75-75 % to LMC this indication was 6196 m³/ha and in the variants (3, 6, 9, 12) with pre-irrigation soil moisture 70-80-80 % to LMC relatively it was 6043 m³/ha and compared to above 1-2 irrigation scheme 52-205 m³/ha less water was wasted.

KEYWORDS: soy bean, plant, irrigation scheme, norm, use, LMC (Limited moisture capacity), water, meter cube, hectare, soil, root, layer, phase, percent.

INTRODUCTION

It is obvious to all that considerable improvement of soil can be achieved by adding soy bean as a main crop to the rotation system of cotton plant and winter wheat which are grown in irrigated farming soils of our republic and it results in yield increase of agricultural crops that are sown in this rotation cropping field.

The introduction of soy bean to rotation system leads to maintaining soil fertility in irrigated lands and the abundant bacteria (*Rhizobium Japonica*) in soy bean roots can easily absorb the nitrogen which are available free in the air, then they can improve the soil, therefore, the crop soy bean serves as a good substitutable plant for all crops [4]

Nowadays it is required to maintain and to increase soil fertility, to provide its biological activeness, to use new effective methods of soil tilling for active development of living organisms in it, to implement advanced technology scientifically based on the cultivation of agricultural crops and finally to select and

sow the varieties of crops with high productivity, precocity, and with high grain quality. And for this it is expedient to carry out thorough and specific scientific researches on the sector.

High yield production of soy bean crop varieties in the condition of Uzbekistan mostly depends on irrigation order and total water consumption of crops. The study of soy bean requirement for water and its elements (atmosphere precipitation, moisture reserve in soil content, use of ground water, using norms for irrigation) have a great practical significance at the present day [2].

MATERIALS AND METHODS

In order to investigate abovementioned problems in 2015-2017 the scientists of Tashkent state agrarian university conducted researches on irrigation orders 70-70-70%, 70-75-75%, and 70-80-80% relatively to pre-irrigation limited moisture capacity of typical virgin soil of Kashkadarya region where in the soy bean varieties

Uzbekistan-2, Orzu, Oltin toj and Selecta-201 [6, 7] were sown [1, 3, 5]

RESULTS AND DISCUSSION

For the determination of total water consumption of soy bean varieties under the study in experimental plot the atmospheric precipitation amount during plant growth period, water amount absorbed by plants from moisture reserve in this period and seasonal irrigation norms for soy bean growth, development and yield accumulation were regarded as well. Seasonal escapement depth of ground water in experimental plot was deeper than 3 m and soy bean crops couldn't use this water. The 1st table illustrates the results of the study of total water consumption of soy bean varieties in experimental field. As this table data shows, during the experiment years 2015-2017 the most water consumption was proper as per seasonal irrigation norms in all variants, this amount made 77-90% of total

water consumption by the years. Water consumption from moisture reserve of soil was 7-10% and from atmospheric precipitation showed 3-16%. The study of total water consumption of soy bean crops on pre-irrigation soil moisture in experimental plots showed that during the growth period pre-irrigation soil moisture proportion to LMC (limited moisture capacity) was 70-70-70 % and in this variants (1, 4, 7, 10) total water consumption was average 6248 m³/ha in 3 years, in the variants (2, 5, 8, 11) where pre-irrigation soil moisture was 70-75-75 % relatively to LMC total water consumption made 6196 m³/ha and in the variants (3, 6, 9, 12) where pre-irrigation soil moisture was 70-80-80 % relatively to LMC, it was 6043 m³/ha, and here the water consumption was 52-205 m³/ha less than abovementioned 1-2 irrigation order.

Table
Total water consumption of soy bean crops varieties

№	Water source	Pre-irrigation soil moisture relatively to LMC					
		70-70-70%		70-75-75 %		70-80-80%	
		m ³ /ha	%	m ³ /ha	%	m ³ /ha	%
In 2015							
1	Atmospheric precipitation	180	3	180	3	180	3
2	Using moisture reserve of soil	467	8	380	7	321	6
3	Seasonal irrigation norm	5133	89	5231	90	5221	91
4	Total water consumption	5780	89	5791	90	5722	100
In 2016							
1	Atmospheric precipitation	640	10	640	10	640	10
2	Using moisture reserve of soil	569	9	409	7	300	5
3	Seasonal irrigation norm	5185	81	5152	83	5185	85
4	Total water consumption	6337	100	6201	100	6125	100
In 2017							
1	Atmospheric precipitation	970	15	970	14	970	16
2	Using moisture reserve of soil	540	8	438	7	394	6
3	Seasonal irrigation norm	5117	77	5188	79	4917	78
4	Total water consumption	6627	100	6596	100	6281	100

In order to get 1 centner grain yield from soy bean crops the used water norms were studied, seasonal irrigation norm and the ratio of total water consumption to produced yield was determined.

Determination results have been presented in table-1. As this table showed the data for the production of 1c grain yield the used water norm varied depending on varieties features, seasonal water norms and total water consumption and the amount of produced yield.

For producing 1 c grain yield from all soy bean varieties in the experiment the least water amount was observed in 2,5,8 and 11 variants where pre-irrigation soil moisture was 70-75-75% relatively to LMC, water consumption in these variants was 171,8-200,2 m³/c. Relatively more water consumption was 187,8-217,4 m³/c in the variants 1,4,7,10 in which pre-irrigation soil

moisture was 70-70-70 % relatively to LMC. In the variants 3,6,9 and 12 where pre-irrigation soil moisture was 70-80-80 % relatively LMC was 176,8-205,6 m³/c.

When water amount used for 1 c grain yield production from soy bean crop varieties was compared among the variants the least water consumption 171,8-187,8 m³/c was observed in Uzbekistan-2 variety of soy bean in all irrigation orders, after it also was observed in Oltin toj and Selecta -201 varieties – 189,2-208,5 m³/c, a bit more water use was observed in Orzu variety, that is, water amount was 200,2-217,4 m³/c.

CONCLUSION

1. During the growth period of soy bean crop varieties under study in experimental plot 72-77-90% of total water consumption made irrigation water, the

remaining 10-23% was atmospheric precipitation and moisture reserve water in soil content.

2. For the production of 1c grain in all soy bean varieties the least water use was observed in the variants 2, 5, 8 and 11 where pre-irrigation soil moisture was 70-75-75 % relatively to LMC and its amount was 171,8-200,2 m³/c which was observed in Uzbekistan-2 variety of the study. The amount made 171,8-187,8 m³/c. This indication was 17,4-20,7 m³/c less compared to Oltin toj and Selecta-201 varieties, and compared to Orzu variety 28,4-29,6 m³/c less.

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