COTTON PRODUCTION IN VODAFONE SMART VILLAGE

In Vodafone Smart Village application campus located in Kasaplar neighborhood of Koçarlı district of Aydın province, it was studied on the yield and water use efficiency of above-ground irrigation practices in cotton irrigated with drip irrigation using Lima variety of Progen company.

Among irrigation methods, the importance of drip irrigation method comes to the forefront in terms of uniform water use, high efficiency, saving irrigation water and ease of operation. In our country, drip irrigation method has been concentrated in the regions where greenhouse cultivation and vegetable agriculture are intensively practiced until recent years. Nowadays, due to the lack of the desired irrigation water at the desired flow rate and time due to global warming, its use has started to increase gradually in most of our regions in all kinds of plant cultivation. In order to increase agricultural production, other resources such as irrigation, fertilization, spraying, use of good seeds and energy use should be used optimally.

Cotton is a highly sensitive plant to soil moisture conditions. However, climatic conditions, growth period and soil characteristics affect plant water requirements. For this reason, it has been determined that irrigation during critical periods is very beneficial even in regions where cotton grows under natural rainfall conditions. Since cotton is classified as a summer crop, irrigation is one of the basic elements for cotton production almost everywhere from semi-arid to arid climates. As a result of the researches, it has been determined that the yield of cotton grown under irrigated conditions is 3-4 times higher than that grown under non-irrigated conditions. However, if irrigation is not done on time and properly or if too much water is applied, it can cause significant reductions in yield and can also cause barrenness in the soil. For these reasons, cotton irrigation is an issue that needs to be emphasized with great importance.

Soil and Irrigation Water Characteristics of Production Land

Irrigation water analysis results

	Analiz Adı		Metod	Birimler	Sonuç	Değerlendirme
KİMYASAL ANALİZLER	*EC (Tuzluluk)	:	Potansiyometrik	µmhos/cm	700	Orta Tuzlu
	*pH	:	Potansiyometrik		7,32	Çok İyi
KATYONLAR	Ca (Kalsiyum)	:	AAS	me/l	3,01	
	Mg (Magnezyum)	:	AAS	me/l	2,93	
	Na (Sodyum)	:	AAS	me/l	0,88	
	K (Potasyum)	:	AAS	me/l	0,04	
	Toplam Katyonlar	:		me/l	6,85	
ANYONLAR	CO_3 (Karbonat)	:	Titrimetrik	me/l	0,00	
	HCO_3 (Bikarbonat)	:	Titrimetrik	me/l	2,40	
	*Cl (Klor)	:	Titrimetrik	me/l	5,20	İyi
	SO_4 (Sülfat)	:	Hesaplama	me/l	-0,75	Çok İyi
	Toplam anyonlar	:		me/l	6,85	
	B (Bor)	:	AAS	mg/l	0,00	
KALİTE ÖZELLİKLERİ	ÇSY	:		%	17,22	Çok İyi
	SAO	:			2,92	Çok İyi
	BSK	:		me/l	0,00	Emniyetle kullanılabilir
	Ozmatik Basınç	:		atm	0,25	
	Çözünmüş Katılar	:		mg/l	447,79	
	Tuz	:		%	0,04	
	DSY	:			3,07	
	FSD	:			29,67	Oldukça Sert

Soil properties analysis result

When the soil properties of the production land are examined, it is seen that the lime ratio is very high. It is noticeable that the potassium ratio is high. Magnesium and calcium amounts were found to be high.

Production area soil characteristics 1st plot

ANALİZ ADI		METOD	BİRİMİ	SONUÇ	YORUM
Bünye	:	Saturasyon	%	38,06	Tınlı
pH	:	Saturasyon		7,61	Hafif Alkalin
EC (Tuz)	:	Saturasyon	mhos/cm	1,33	Tuzsuz
Kireç ($CaCO_3$)	:	Kalsimetrik	%	18,86	Çok Kireçli
Organik Madde	:	W.Black	%	1,20	Az
Fosfor (P_2O_5)	:	Olsen Spec.	Kg P_2O_5/da	6,18	Orta
Potasyum (K_2O)	:	A.Ac.- AAS	Kg K_2O/da	86,30	Yüksek
Magnezyum	:	A.Ac.- AAS	me/100 g	9,02	Fazla
Kalsiyum	:	A.Ac.- AAS	me/100 g	29,21	Fazla
Bakır	:	DTPA - AAS	ppm	2,06	Yeterli
Demir	:	DTPA - AAS	ppm	1,70	Az
Mangan	:	DTPA - AAS	ppm	9,82	Az
Çinko	:	DTPA - AAS	ppm	0,96	Yeterli

Production area soil characteristics 2nd plot

ANALİZ ADI		METOD	BİRİMİ	SONUÇ	YORUM
Bünye	:	Saturasyon	%	**49,30**	Tınlı
pH	:	Saturasyon		**7,97**	Hafif Alkalin
EC (Tuz)	:	Saturasyon	mhos/cm	**0,35**	Tuzsuz
Kireç ($CaCO_3$)	:	Kalsimetrik	%	**9,87**	Kireçli
Organik Madde	:	W.Black	%	**1,37**	Az
Fosfor (P_2O_5)	:	Olsen Spec.	Kg P_2O_5/da	**14,49**	Çok yüksek
Potasyum (K_2O)	:	A.Ac.- AAS	Kg K_2O/da	**55,58**	İyi
Magnezyum	:	A.Ac.- AAS	me/100 g	**11,69**	Fazla
Kalsiyum	:	A.Ac.- AAS	me/100 g	**6,90**	Yeterli
Bakır	:	DTPA - AAS	ppm	**1,69**	Yeterli
Demir	:	DTPA - AAS	ppm	**1,25**	Az
Mangan	:	DTPA - AAS	ppm	**18,09**	Yeterli
Çinko	:	DTPA - AAS	ppm	**1,02**	Yeterli

Production Steps

Planting the seed

Cotton planting depth varies depending on planting time, soil structure, soil moisture depth and temperature. For most places where cotton is grown, a planting depth of 2.5-4 cm is sufficient.

Images of the first emergence of seedlings

Main Maintenance Operations Performed:

Crushing cream: Seeds normally germinate one week to 10 days after sowing. If there is excessive rainfall or germination irrigation during germination, a layer of cream forms in the soil and prevents the germinating plants from emerging to the surface of the soil. As a result, the young plant cannot surface and dries up. For this reason, a light rake or hoe should be passed over the soil surface to break up the cream layer.

Hoeing It is one of the most important maintenance works in cotton cultivation. Hoeing in the cotton field is done manually and with hoeing machines. In irrigated cotton cultivation, 2-3 times hand hoeing and 3-4 times tractor hoeing should be done depending on the weed status of the field.

Thinning: When excess seed is used in cotton sowing, there are more seedlings than the required number of seedlings per unit area. Excess seedlings must be removed. This process is called thinning. Thinning should be done as early as possible but when the plants are less affected by adverse conditions. Therefore, thinning should be completed within 20 days after seedling emergence.

Weed control: If weeds proliferate on the soil surface after rain or irrigation, the third or fourth hoeing can be done. These hoes are not too deep.

Control of diseases and pests, use of growth regulators, defoliation.

Irrigation and Fertilization: The water requirement of the cotton plant varies between 500-700 mm. The water requirement of the cotton plant can be understood by looking at the plant and soil condition. In cotton plants that do not get enough water, stagnation and shriveling are observed, leaf color darkens, redness in the stem progresses to the top bud, a rapid flowering begins, shaking increases, boll formation decreases and shrinks. It is past time to irrigate, especially if the white flower is close to the top of the plants and this is clearly visible in the whole field. Irrigation should be done before this situation occurs. The cotton plant needs the most water during the flowering period. After the first irrigation, the irrigation interval should be decided by checking the moisture in the soil and the plant.

While nitrogen fertilizers ensure the vegetative development and growth of cotton, phosphorus fertilizers affect the increase in the number of combs, flowers and bolls, the size of the bolls and early ripening rather than the vegetative development of cotton, abundant leaves and

branches. It is stated that potassium fertilizers increase the usefulness of nitrogen and phosphorus fertilizers to the plant and prevent their negative effects in cases where these two fertilizers are given too much.

The most appropriate irrigation method should be selected for effective irrigation in cotton cultivation. The aim of the appropriate irrigation method is to ensure that water reaches the root zone effectively with minimum loss. The choice of irrigation method varies according to soil conditions, topography, water source, climate, leveling-drainage condition, economic factors and farmer habits. In the drip irrigation method, the water required for plant development is applied to the soil surface in drops under low pressure with special tools called drippers placed near the plant with a pressurized pipe network.

Establishing a good irrigation program in cotton and keeping soil moisture at appropriate levels are important for shoot growth, flower and boll formation, healthy development of bolls and opening of matured bolls. Irregular changes in soil moisture or below the desired level during the growing period of the cotton plant can affect the growth and lead to the shedding of flowers and bolls. During the flower-boll formation period, the frequency of irrigation should be decided according to the structure of the soil and the weather conditions. Late June and July are the months when irrigation starts. During the cocoon maturity-opening period, August is the month when water is needed the most. In September, water can be reduced or not irrigated at all.

Pamuk Maliyet Raporu (Ha)	
Gübreleme	365,66 £
İlaçlama	16,22 £
Sulama	15,7 £
Sulama Malzemeleri	13,0 £
İşçilik	23,9 £
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Ziraat Mühendisi/Tekniker	23,6 £
Toplam	492,58 £
Pamuk Toplam Alan 1,8 Ha	