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EFFECT OF SEAWEED EXTRACT AND MULCHING BY DIFFERENT PLASTIC COLOUR ON VEGETATIVE GROWTH AND YIELD OF TWO EGGPLANTS HYBRID (*Solanum melongena L.*).

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ABSTRACT

The experiment was done at Malta agriculture research center of Duhok, Kurdistan region-Iraq at growing season 2019 in open field to investigate the effect of plastic mulch (without mulch, clear and black) and seaweed extract (Maxi Grow) at three levels (0.0ml.l^{-1}, 30 ml.l^{-1} and 60 ml.l^{-1}) on vegetative growth and yield of two eggplants hybrid (Anomoro and Vivo). The result showed that the clear mulch effected significantly on fruits length (cm), fruit diameter (cm), number of fruits/plant, yield/plant kg, and yield/m ^{2}. While the black mulch was superior in fruits weight (g). However, seaweed at level 6o ml.l^{-1} gave the highest numbers of branch, yield/plant (kg) and yield/hectares (ton/ha). While the concentration 30 ml.l^{-1} increased number of fruit/plant.

KEY WORD: Seaweed, mulch, eggplant hybrid

INTRODUCTION

Eggplant (*Solanum melongena L.*) is a communal vegetable grown in tropical and sub tropical, some temperate regions,*(Das et al.2010*) it is also known Aubergine . Solanum species (eggplants) belongs to the family of Solanaceae and genus Solanum, by over 1,000 species worldwide (*Agoreyo et al., 2012*).

Eggplant is a perennial plant but full-grown commercially as an annual produce. The specie belongs nightshade family (kantharajah and golegaonkar 2004). Eggplants are create in various sizes, shapes, colour of fruits, and free from defects considered as main aspects for the exterior of eggplant fruit (Chen and Li, 2000). Eggplants for human consuming contains 1.4gm protein 40gm carbohydrates, fiber, 2mg vitamin C. Composition beneficial for human health. They are also a rich source of potassium, magnesium, calcium and iron (Zenia and Halina, 2008).

Polyethylene plastic mulch is widely used for crop production due to the fact that it controls weeds, saves soil humidity, rises soil temperature. Growths crop yield quality and is readily obtainable and at a relatively little cost. Researchers using black plastic instead of bare soil have reported higher yields (*Brown J .E and C. Butcher 1999);*

In some circumstance, plastic mulches have many advantages such as increased earlier maturing of crops, harvests quality, improved weed control, reduces evapotranspiration from the soil and enhance crop yield. The effect of black polyethylene on soil properties and crop yield has been studied by several workers (*Miyasaka et al., 2001; Moreno and Moreno, 2008; Oñate and Peco, 2005; Hatimi, S.; A. Nourjou; M. Henareh and L. Pourakbar (2012))*

The seaweed items improve seeds germination, seedlings encroachment, increment plant resistance to natural stresses (Zhang, X.; E. H. Ervin and R. E. Schmidt (2003)) and improve plant development and yield . Seaweed liquid fertilizers were found superior to the synthetic one due to the presence of high levels of organic matter, therefore accounting a decrease of half expense for chemical fertilizer (Aitken and Senn 1965). Seaweeds are one of the most significant marine resources of the world and being utilized as human nourishment, animal feed and raw material for some industries, they are additionally utilized manure for agricultural and horticultural crops (Chapman and Chapman1980).

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Cultivar variety is one of the essential choice that the cultivator should be taken into explanation every period.

MATERIALS & METHODS

The experiment was conducted in the research farm in Malta station, Duhok / Iraq during 2019 growing season, which located at (latitude 36.51N, longitude 42.52 E and 473 m above sea level). The area of experience was 500 m^2. It was equipped with drip irrigation system.

Field research was arranged in experiments of factorial were carried with split – split plot design in (RCBD) with three replication. Hybrids as distributed in the main plot, sea weed treatment was arranged in the sub plots, and plastic mulch in sub – sub plot The experience consisted of two Eggplants Hybrid (Anomoro and Vivo) , three plastic mulch (Black, Clear and bare soil) and three level of sea weed (Maxi Grow) (0.0 $m.l^{-1}$ 30 $m.l^{-1}$ 60 $m.l^{-1}$ (2x3x3 = 18). Mulching was done before planting, sea weed spraying were applied three times within fifteen days intervals, starting after 4 true leaves stage. The results were analysed using the SAS, program. Means value were compared using Duncan's multiple range test at 0.05 or 5% level (AL-Rawi and Khalaf Alah, 2000).

For data collection five plants were randomly selected from each experimental

RESULTS

Plant height (cm)

Data present in table (1) showed no difference between hybrids in plant height. Concerning the effect of mulching on plant high observer significant difference the clear mulch had higher plant height, clear mulch 107.56 cm compared without mulch 100..94 cm. About the effect of seaweed on plant height no difference had been between all level of seaweed on plant height. Regarding the interaction between cultivars and mulching showed significant difference, Anomoro hybrid had higher value **(**110 cm) in clear mulching. The interaction between cultivars and seaweed no difference occurred between them. The interaction between mulching and seaweed it is significant difference at level of 60ml.L^{-1}. (115.83cm) in clear mulch compared by black mulch (98.33 cm), hybrid had higher value The interaction among all factors showed the plant height was significant at Vivo hybrid (116.Anomoro00 cm)., 60ml.L-^{1} in clear mulching and 115.67cm clear mulching at Anomoro hybrid (115.67 cm).

Table (1): Effect of seaweed and mulching by different plastic colour on plant height (cm) of two Eggplants hybrid.

Cultivars	Mulching	seaweed.			Cultivars*mulch	Cultivars
		0 $ml.l^{-1}$	30 $ml.l^{-1}$	60 $ml.l^{-1}$		
Anomoro	Without	90.67 d	101.33 a-d	94.33 cd	95.44 c	103.22 a
	Clear	106.00 a-d	109.00 a-c	115.67 a	110.22 a	
	Black	103.00 a-d	106.00 a-d	103.00 a-d	104.00 a-c	
Vivo	Without	112.00 ab	101.67 a-d	105.67 a-d	106.44 ab	103.37 a
	clear	95.00 b-d	103.67 a-d	116.00 a	104.89 ab	
	Black	100.33 a-d	102.33 a-d	93.67 cd	98.78 bc	
seaweed.		101.17 a	104.00 a	104.72 a	Mulching	
Cultivars* seaweed.	Anomoro	99.89 a	105.44 a	104.33 a		
	Vivo	102.44 a	102.56 a	105.11 a		
Mulch* seaweed.	Without	101.33 b	101.50 b	100.00 b	100.94 b	
	Clear	100.50 b	106.33 ab	115.83 a	107.56 a	
	Black	101.67 b	104.17 b	98.33 b	101.39 b	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Number of branches:

The table (2) shows no variance between hybrids regarding the number of branches only hybrid vivo was superior 16.22 in comparison with Anomoro hybrid 15.59 branch. About the effect of mulching no significant difference among. Concerning the effect of seaweed was significant difference among level of seaweed sprayed at rate of 60 ml.l^{-1} 16.67 branches compared with out spray 14.89 rise by 10.67%.

In case of interaction between cultivars and mulching, there was no significant variance between them the interaction between cultivars and seaweed remarked significant difference, hybrid Vivo 17 branches at level of 60 ml.l^{-1}.

Table (2): Effect of spray with seaweed and mulching by different plastic colour on number of branches of two Eggplants hybrid.

Cultivars	Mulching	Conc.			Cultivars*mulch	Cultivars
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	14.00 bc	15.00 bc	15.00 ac	14.67 a	15.59 a
	Clear	15.33 a-c	17.67 a-c	16.33 a-c	16.44 a	
	Black	14.00 bc	15.33 a-c	17.67 a-c	15.67 a	
Vivo	Without	18.00 ab	17.33 a-c	15.33 a-c	16.89 a	16.22 a
	Clear	13.33 c	17.00 a-c	19.67 a	16.67 a	
	Black	14.67 bc	14.67 bc	16.00 a-c	15.11 a	
seaweed.		14.89 b	16.17 ab	16.67 a	Mulching	
Cultivars* seaweed.	Anomoro	14.44 b	16.00 ab	16.33 ab		
	Vivo	15.33 ab	16.33 ab	17.00 a		
Mulch* seaweed.	Without	16.00 ab	16.17 ab	15.17 ab	15.78 a	
	Clear	14.33 b	17.33 ab	18.00 a	16.56 a	
	Black	14.33 b	15.00 ab	16.83 ab	15.39 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

In a seam table the interaction between mulching and seaweed observer significant difference at level of 60 ml.l^{-1}in clear mulching 18 branches comparative with control 14.33 branches. Regarding the triple interaction it was significant difference among three factors in concentrates

60 ml.l^{-1} in clear mulch at vivo hybrid 19.67 comparative with control 13.33 in a seam hybrid.

Fruit weight (g)

Table number (3) demonstrated no significant difference in average fruit weight between both eggplant hybrids, the hybrid Vivo was superior with 185.52g/fruit compared by Anomoro 175.04g.

There was no significance between seaweed concentration a supra fruit weight. Regarding the influence of mulching there was significant changes among the plastic color on fruit weight, black mulching was superior 192.22g compared by without mulch 1 57.67g rising by 22.36% .

About the interaction between cultivars and mulching there were significant variances between cultivars and mulching the cultivar Vivo with clear mulch 203.88g compared with out mulch 157.00g at Anomoro hybrid.

Concerning the collaboration between cultivars and seaweed concentration no significant difference between cultivars and seaweed, Vivo hybrid was superior 188.00g in concentration 60 ml.l^{-1} compared with 169.44g at level 30 ml.l^{-1}

Regarding the interaction between mulching and seaweed level, there were significant change, at level of 60 ml.l^{-1} was 211.52g in black mulch compared with a seam level 148.50g, with out mulch increasing by 29.78%.

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Table (3): Effect of spray with seaweed and mulching by different plastic colour on fruit weight (g) of two Eggplants hybrid.

Cultivars	Mulching	Conc.			Cultivars*mulch	Cultivars
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	157.33 d-f	164.67 c-f	149.00 f	157.00 c	175.04 a
	Clear	168.33 c-f	171.67 b-f	194.00 a-d	178.00 b	
	Black	184.00 a-f	172.00 b-f	214.33 a	190.11 ab	
Vivo	Without	155.00 ef	172.00 b-f	148.00 f	158.33 c	185.52 a
	Clear	198.00 a-c	206.33 ab	207.33 ab	203.89 a	
	Black	191.33 a-e	183.00 a-f	208.67 ab	194.33 ab	
Seaweed		175.67 a	178.28 a	186.89 a	Mulching	
Cultivars*Conc.	Anomoro	169.89 a	169.44 a	185.78 a		
	Vivo	181.44 a	187.11 a	188.00 a		
Mulch*Conc.	Without	156.17 de	168.33 c-e	148.50 e	157.67b	
	Clear	183.17 bc	189.00 a-c	200.67 ab	190.94 a	
	Black	187.67 a-c	177.50 b-d	211.50 a	192.22 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

The interaction among three factors there were significant difference, best result obtained in Anomoro hybrid at level of 60 ml.l^{-1}and black mulch 214.33g compared with 148g in a seam level with out mulch in Vivo hybrid rising by 30.9%.

Number of fruit /plant

Table (4) illustrated number of fruit /plant, no difference was found between hybrids regarding number off fruits/plant. The effect of seaweed on number of fruits, remarked a significant difference among level of seaweed on concentration of 30 ml.l^{-1} 11.84 compared with out seaweed 11.27 fruits. Concerning the influence of mulching were significant difference among mulching, the best result obtained with clear mulch 12.07 fruits compared with out mulch 10.98 rise by 9.27%.

About the interaction between cultivars and mulching there were significant difference in number of fruit/ plant, hybrid Anomoro were superior with clear mulch 12.14 fruits compared without mulch 11.17 in a seam hybrid increasing by 8.68%.

Concerning the interaction between cultivars and seaweed level, there were substantial difference between hybrid and amount of seaweed, hybrid Anomoro overcome 11.99 fruits at rate of 30 ml.l^{-1} at the seam hybrids at level zero ml.l^{-1} 11.16 fruits rising by 6.92%.

The collaboration between mulching and level of seaweed, there were significant variance, the clear mulch at rate of 30 ml.l^{-1} 12.25fruits compared by control without mulch 10.42 fruits was raised by 14.93%.

Regarding the interaction among three factors observer significant difference hybrid Anomoro at level of 60 ml.l^{-1} and clear mulch 12.40 fruits compared by a seam hybrid 10.13 with out mulch rise by 22.40%.

Table (4): Effect of spray with seaweed and mulching by different plastic colour on number off fruit fruit/ plant.

Cultivars	Mulching	seaweed			Cultivars*mulch	Cultivars
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	10.13 g	12.37 a	11.00 d-f	11.17 b	11.51 a
	Clear	11.83 a-d	12.20 a-c	12.40 a	12.14 a	
	Black	11.50 b-d	11.40 c-f	10.77 e-g	11.22 b	
Vivo	Without	10.70 e-g	11.07 d-f	10.63 fg	10.80 b	11.51 a
	Clear	12.23 a-c	12.30 ab	11.47 b-f	12.00 a	
	Black	11.23 d-f	11.73 a-d	12.27 ab	11.74 a	
seaweed.		11.27 b	11.84 a	11.42 b	Mulching	
Cultivars*Conc.	Anomoro	11.16 c	11.99 a	11.39 bc		
	Vivo	11.39 bc	11.70 ab	11.46 bc		
Mulch*Conc.	Without	10.42 d	11.72 a-c	10.82 d	10.98 c	
	Clear	12.03 ab	12.25 a	11.93 a-c	12.07 a	
	Black	11.37 c	11.57 bc	11.52 bc	11.48 b	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Fruit diameter (cm)

Table (5) shown the effect of mulching and spray with seaweed on fruit diameter. The hybrid vivo (3.83 cm) was significant variation compared with anomoro hybrid (3.72 cm)) raised by 2.95% .

The effect of mulching on fruit diameter no significant affect. About the effect of seaweed on fruit diameter were significant difference at level of 60 ml.l^{-1} 3.82cm compared by 3.72 cm at rate of 30 ml.l^{-1} rises with 2.61%. The interaction between cultivars and mulching on fruit diameter which caused significant effected hybrid Vivo (3.87 cm) a supra control (3.60 cm). About the interaction between cultivars and seaweed spraying was significant difference, best result obtained in hybrid Vivo (3.89 cm) at level 60 ml.l^{-1} compared by 3.69 cm in concentrate 30 ml.l^{-1}. Concerning the binary interaction between mulching and seaweed concentration on fruit diameter, its caused significant the high value obtained 3.89cm at level of 60 ml.l^{-1}in clear mulch compared with control 3.66 cm in black mulch

Table (5): Effect of spray with seaweed and mulching by different plastic colour on fruit diameter (cm) of two Eggplants hybrid

Cultivars	**Mulching**	**seaweed.**			**Cultivars*mulch**	**Cultivars**
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	3.71 bc	3.74 bc	3.63 c	3.69 c	3.72 b
	Clear	3.75 bc	3.70 bc	3.86 a-c	3.77 a-c	
	Black	3.75 bc	3.63 c	3.75 bc	3.71 bc	
Vivo	Without	3.77 a-c	3.84 a-c	3.87 ab	3.83 ab	3.83 a
	Clear	3.88 ab	3.73 bc	3.99 a	3.87 a	
	Black	3.88 ab	3.69 bc	3.81 a-c	3.79 a-c	
seaweed.		3.79 ab	3.72 b	3.82 a	Mulching	
Cultivars*Conc.	Anomoro	3.74 bc	3.69 c	3.74 bc		

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	Vivo	3.84 ab	3.75 bc	3.89 a	
Mulch*Conc.	Without	3.74 b	3.79 ab	3.75 b	3.76 a
	Clear	3.82 ab	3.72 b	3.92 a	3.82 a
	Black	3.82 ab	3.66 b	3.78 ab	3.75 a

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

About the triple interaction among three factors observer significant difference

Between factors the best result obtained in hybrid Vivo (3.99 cm) at level of 60 ml.l^{-1} in clear mulch compared with 3.66 cm rising by 8.27%.

Fruit length (cm)

Table (6) Demonstrated the effect of seaweed sparing and mulching of two eggplants hybrid on fruit length (cm), which affected significantly difference between hybrids. Hybrid Anomoro overcome on hybrid Vivo 14.37 cm respective 13.86 cm increasing by 3.54%.

About the effect of mulching on fruit length remarked significant affect on the clear mulch 14.37cm compared without mulch 13.83 cm. Regarding the effect of seaweed on eggplant fruits length, observer no significant difference among seaweed rate application.

Regarding the interaction between cultivars and mulching on fruit length which initiated significant difference hybrid Anomoro with clear mulch 1 4.82 cm compared with Vivo hybrid 13.72 cm rise by 7.42%. About interaction between cultivars and seaweed remarked significant difference between hybrids and seaweed sparing hybrid Anomoro 14.55 cm at level 60 ml.l^{-1} increased by 5,5% a supra Vivo at level zero seaweed.

Table (6): Effect of spray with seaweed and mulching by different plastic colour on fruit length (cm) of two Eggplants hybrid.

Cultivars	**Mulching**	**seaweed.**			**Cultivars*mulch**	**Cultivars**
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	14.08 bc	13.80 bc	13.94 bc	13.94 b	14.37 a
	clear	14.20 bc	14.85 ab	15.42 a	14.82 a	
	black	14.63 ab	14.13 bc	14.29 bc	14.35 ab	
Vivo	Without	13.42 c	13.71 bc	14.02 bc	13.72 b	13.86 b
	clear	13.77 bc	14.08 bc	13.90 bc	13.92 b	
	Black	14.07 bc	13.84 bc	13.94 bc	13.95 b	
seaweed.		14.03 a	14.07 a	14.25 a	Mulching	
Cultivars*seaweed.	Anomoro	14.30 ab	14.26 ab	14.55 a		
	Vivo	13.76 b	13.88 b	13.95 ab		
Mulch* seaweed.	Without	13.75 b	13.76 b	13.98 ab	13.83 b	
	Clear	13.98 ab	14.47 ab	14.66 a	14.37 a	
	Black	14.35 ab	13.98 ab	14.11 ab	14.15 ab	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Apropos the interaction between mulching and seaweed caused significant difference at level of**60** ml.

l^{-1} with clear mulch 14.66 cm compared without mulch and zero seaweed 13.75 cm.

About the triple interaction among three factors the results was a significant difference the high value in Anomoro hybrid 15.42 cm at level 60 ml.l^{-1} with clear mulch comparative with Vivo hybrid 13.42 cm without mulching increasing by 12.97%.

Total chlorophyll content (SPAD)

Regarding data in the table (7) Demonstrated no significant variance between hybrids on chlorophyll content in eggplant leaves Hybrid Vivo was better than Anomoro 63.68 respective 62.21 .

The effect of mulching a supra chlorophyll content in eggplant leaves was significant difference the clear mulch with 64.52 was superior compared without mulch 60.57. Concerning the effect of seaweed on chlorophyll content no significant difference between all level of seaweed application.

Table (7): Effect of sparing with seaweed and mulching by differed plastic color on vegetative and yield of two Hybrids of Eggplant on leaf chlorophyll percentage(SPAD)

Cultivars	Mulching	seaweed.			Cultivars*mulch	Cultivars
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	61.77 ab	59.23 b	61.17 ab	60.72 b	62.21 a
	Clear	64.83 ab	63.70 ab	61.13 ab	63.22 ab	
	Black	63.40 ab	61.57 ab	63.07 ab	62.68 ab	
Vivo	Without	59.17 b	59.83 b	62.23 ab	60.41 b	63.68 a
	Clear	69.00 a	64.13 ab	64.30 ab	65.81 a	
	Black	63.03 ab	64.73 ab	66.67 ab	64.81 ab	
seaweed.		63.53 a	62.20 a	63.09 a	Mulching	
Cultivars* seaweed.	Anomoro	63.33 a	61.50 a	61.79 a		
	Vivo	63.73 a	62.90 a	64.40 a		
Mulch* seaweed.	Without	60.47 b	59.53 b	61.70 ab	60.57 b	
	Clear	66.92 a	63.92 ab	62.72 ab	64.52 a	
	Black	63.22 ab	63.15 ab	64.87 ab	63.74 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

In interaction between cultivars and mulching observer significant difference between cultivars and mulching, the best result obtained in hybrid Vivo 65.81 at clear mulching compared with hybrid Anomoro 60.72 without mulch, with increasing by 7.73%.

Also the interaction between cultivars and seaweed on chlorophyll content in eggplant leaves was no significant in chlorophyll in both hybrids, the best result were obtained in Vivo hybrid at rate of 60 ml.l^{-1} 64.40 compared with hybrid Anomoro at rate of zero seaweed in clear 63.33.

About the interaction between mulching and seaweed on chlorophyll content in the eggplant leaves, showed significant difference between mulching and seaweed observer in the clear mulch 66.92 without seaweed ,compared without mulch at level of 30 ml.l^{-1} 59.53 rise by 11.04%.

The interaction among three factors remarked significant difference on chlorophyll content in the leaves. The highest value obtained in Vivo hybrid with clear mulching without seaweed 69.00 comparative with control 59.17 at level 30 ml.l^{-1} increasing by 14.24%.

Fresh weight (kg)

Data from table (8) show no significant difference between both hybrids regarding the fresh weight in vegetative growing. Hybrid Vivo gave higher result o.615 kg compared to Anomoro hybrid 0.564 kg increased by 829%.

About the effect of mulching on vegetative fresh weight at eggplant hybrids, no significant difference between mulching, clear mulch 0.631kg compared without mulch 0.566kg. Regarding the effect of seaweed no significant chinch between all level a supra fresh weight in vegetative growth of eggplant.

About the interaction between cultivars and mulching in fresh weight remarked no significant difference between hybrids. In the level of 60 ml.l^{-1} and clear mulching gave 0.681 kg

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increasing by 8.95% a supra hybrid Anomoro without mulching 0.529 kg.

Concerning the interaction between cultivars and spraying with seaweed on fresh weight in eggplant showed no significant modification between hybrids and rate of seaweed application, in the rate of **60** ml.l^{-1} and clear much, Vivo hybrid gave 0.687 kg raised by 5.12% a supra hybrid Anomoro at level of **30** ml.l^{-1}

Apropos the collaboration between mulching and seaweed application on fresh weight observer no significant difference in all level of seaweed and mulching best result obtained at rate of **60** ml.l^{-1} in clear mulch 0.657 and without seaweed rate of zero ml.l^{-1} seaweed gave 0.524 kg.

Referring the interaction among all factor it was no significant difference among three factor bout hybrid Vivo gave maximum result 0.723kg fresh weight at level of **30** ml.l^{-1} without mulching compared with control 0.479 kg at level of zero ml.l^{-1}

Table (8): Effect of spray with seaweed and mulching by different plastic colour on fresh weight (kg) of two Eggplants hybrid.

Cultivars	Mulching	seaweed.			Cultivars*mulch	Cultivars
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	0.569 a	0.528 a	0.489 a	0.529 a	0.564 a
	Clear	0.533 a	0.570 a	0.636 a	0.580 a	
	Black	0.642 a	0.566 a	0.546 a	0.584 a	
Vivo	Without	0.479 a	0.723 a	0.607 a	0.603 a	0.615 a
	Clear	0.702 a	0.665 a	0.677 a	0.681 a	
	Black	0.536 a	0.674 a	0.471 a	0.561 a	
seaweed.		0.577 a	0.621 a	0.571 a	Mulching	
Cultivars* seaweed.	Anomoro	0.581 a	0.555 a	0.557 a		
	Vivo	0.572 a	0.687 a	0.585 a		
Mulch* seaweed.	Without	0.524 a	0.626 a	0.548 a	0.566 a	
	Clear	0.617 a	0.617 a	0.657 a	0.631 a	
	Black	0.589 a	0.620 a	0.509 a	0.573 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Dry weight (g)

Table (9) show effect of mulching, seaweed on leaf dry matter of two eggplant hybrids. Data in table (9) demonstrated no significant change between hybrids in dry matter Vivo hybrid gave 149.63 g compared with Anomoro 145.20 g . Plant mulching was not affected significant 157.50g compared with black mulch 139.64g. The effect of seaweed on dry matter no significant difference among all level of seaweed.

Apropos the interaction between cultivars and mulching on dry matter no significant difference between hybrids, Vivo hybrid with clear mulch 168.72 g was higher than Anomoro without mulch was raised by 17.28% .

Concerning the interaction between cultivars and seaweed spraying there was no significant difference between them, highest value obtained in Vivo hybrid at level of **30** ml.l^{-1} 168.06 g, compared with a seam hybrid in zero ml.l^{-1} 134.33 g increasing by 20..07%.

Table (9): Effect of spray with seaweed and mulching by different plastic colour on dry weight (g) of two Eggplants hybrid.

Cultivars	Mulching	seaweed.			Cultivars*mulch	Cultivars
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	143.00 a	145.83 a	129.83 a	139.56 a	145.20 a
	Clear	141.83 a	144.50 a	152.50 a	146.28 a	
	Black	175.67 a	138.33 a	135.33 a	149.78 a	
Vivo	Without	122.17 a	180.50 a	149.33 a	150.67 a	149.63 a
	Clear	172.83 a	159.00 a	174.33 a	168.72 a	
	Black	108.00 a	164.67 a	115.83 a	129.50 a	
seaweed.		143.92 a	155.47 a	142.86 a	Mulching	
Cultivars* seaweed.	Anomoro	153.50 a	142.89 a	139.22 a		
	Vivo	134.33 a	168.06 a	146.50 a		
Mulch* seaweed.	Without	132.58 a	163.17 a	139.58 a	145.11 a	
	Clear	157.33 a	151.75 a	163.42 a	157.50 a	
	Black	141.83 a	151.50 a	125.58 a	139.64 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

Yield/plant (kg)

Table (10) show the effect of spray by seaweed and differed mulching color on yield/plant in kg of two hybrids of eggplant, there were no significant difference between hybrids, hybrid Vivo was higher than Anomoro by 5.97%.

The effect of seaweed on yield/plant no significant difference in all rate of seaweed a supra yield/plant kg. Regarding the effect of mulching, there were significant difference among mulching clear mulch 2.30 compared without mulch 1.73 kg rise by 32.94%.

Concerning the interaction between cultivars and mulching, observed significant difference, hybrid Vivo 2.44g **with** clear mulch over come with a seam hybrid without mulch 1.70 kg increasing by 30.32%.

Table (10): Effect of spray with seaweed and mulching by different plastic colour on yield/ plant (kg) of two Eggplants hybrid.

Cultivars	Mulching	seaweed.			Cultivars*mulch	Cultivars
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	1.59 e	2.04 b-e	1.64 de	1.75 c	2.01 a
	Clear	1.99 b-e	2.09 a-d	2.41 ab	2.16 b	
	Black	2.11 a-d	1.95 b-e	2.30 a-c	2.12 b	
Vivo	Without	1.65 de	1.90 c-e	1.56 e	1.70 c	2.13 a
	Clear	2.42 ab	2.54 a	2.37 a-c	2.44 a	
	Black	2.15 a-c	1.99 b-e	2.57 a	2.24 ab	
Seaweed		1.99 a	2.08 a	2.14 a	Mulching	
Cultivars*Conc.	Anomoro	1.90 a	2.03 a	2.11 a		
	Vivo	2.07 a	2.14 a	2.17 a		
Mulch*Conc.	Without	1.62 c	1.97 b	1.60 c	1.73 b	
	Clear	2.20 ab	2.31 a	2.39 a	2.30 a	
	Black	2.13 ab	1.97 b	2.43 a	2.18 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

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About the interaction between cultivars and seaweed level no significant difference between hybrids and rate of seaweed, higher result obtained in hybrid Vivo 217kg at rate of 60 ml.l^{-1} compared by Anomoro hybrid 1.90 kg without seaweed. The interaction between mulching and seaweed level

There were significant difference black mulch with rate of 60 ml.l^{-1} 2.43 kg compared by without mulch at rate of60 ml.l^{-1} 1.60 kg rise by 34.15%.

Regarding the interaction among three actors, there were significant variance in Vivo hybrid at black mulching and rate of 60 ml.l^{-1} 2.57 kg compared with a seam hybrid and level of seaweed without mulch 1.56 kg increasing by 64.74%.

Total yield ton/ha

Table (11) illustrated effect of seaweed, plastic mulch on yield ton/hectare of two eggplant hybrids, there are no significant differences between hybrids, only hybrid Vivo 80.09 ton/hectar overcome to Anomoro hybrid 74.91ton/hectar by 6.46%.

The effect of seaweed on yield ton/hectare there were no significant modification regarding the rate of seaweed application. About the influence of mulching on yield, there were significant differences among plastic mulch, clear mulch with 86.33 ton/hectare compared without mulch 65.34 ton rise by 32.21 %.

The interaction between cultivars and mulching, it is significant difference between cultivars and plastic mulch color, hybrid Vivo with clear mulch were significant 9154 ton compared by a seam hybrid without mulch 64.92 ton increasing by 29.01%.

Referring the interaction between cultivars and level of seaweed sprayed where were significant change, hybrid Vivo at rate of **60** ml.l^{-1}with 82.24 t/ h compared by hybrid Anomoro at level zero ml.l^{-1} 71.11 t/h rise by 15.65 %.

Concerning the collaboration between mulching and seaweed concentration, there were significant influence a supra yield t/h, best result obtained at level of 60 ml.l^{-1} in black mulch related without mulch without seaweed 91.12 t/h respective 60.75 t/h increasing by 33.32%.

About the interaction among three factor, hybrid Vivo with black mulch at level of 60ml/L 96.07 t/h were significant compared by Anomoro hybrid without mulch in zero rate of seaweed 59.53 t/h increasing by 38.03%.

Table (11): Effect of spray with seaweed and mulching by different plastic colour on yield ton/ha of two Eggplants hybrid

Cultivars	Mulching	seaweed.			Cultivars*mulch	Cultivars
		0 ml.l^{-1}	30 ml.l^{-1}	60 ml.l^{-1}		
Anomoro	Without	59.53 f	76.37 b-f	61.37 ef	65.76 c	74.91 a
	Clear	74.60 b-f	78.60 a-e	90.17 ab	81.12 b	
	Black	79.21 a-e	68.20 d-f	86.17 a-d	77.86 b	
Vivo	Without	61.97 ef	71.10 c-f	61.70 ef	64.92 c	80.09 a
	Clear	90.57 ab	95.10 a	88.97 a-c	91.54 a	
	Black	80.70 a-d	74.60 b-f	96.07 a	83.79 ab	
Seaweed		74.43 a	77.33 a	80.74 a	Mulching	
Cultivars*seaweed.	Anomoro	71.11 b	74.39 ab	79.23 ab		
	Vivo	77.74 ab	80.27 ab	82.24 a		
Mulch*seaweed.	Without	60.75 c	73.73 b	61.53 c	65.34 b	
	Clear	82.58 ab	86.85 a	89.57 a	86.33 a	
	Black	79.95 ab	71.40 bc	91.12 a	80.82 a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other according to Duncan's multiple range test at 5% level.

DISCUSSION

It clear from tables (1- 9) effect of factors studied (Hybrids, Seaweed , mulching) and their interaction have a significant effect on vegetative growth. The result showed that the Hybrid Vivo overcome Hybrid Anomoro on all most vegetative characters (plant height. Number of branches, chlorophyll,fresh and dry matter) and fruits characters (fruits weight, number of fruit/plant, fruit diameter, and yield). This effect my be due to differences in genotype between Hybrids, and different in root system to absorbs more nutrition (Rasheed, S,M, S 2013) or better environmental condition reported by (Mohammed, 2015. Passam and khah 1992).

Seaweed extract has a better role in development of fruit and yield in eggplant and vegetative character the confident effect of seaweed extract may be due to the role in improving vegetative growth such as number of branches and leaves area which leads more absorption of nutrient element the effect are in agreement with (Mohammed, 2013 and Abd El-Gawad and Osman 2014).

Regarding the effect of plastic mulch, its clear in table (1 – 9) mulching had increased almost all vegetative characters. Clear plastic mulch hade better result compared with bare soil. This will be clarified in opinion in soil temperature and moisture (Abu-Goukh and El-Balla, 2003 and Mamkagh, 2009).

The develop fruit yield under plastic mulch can by also be attributed to reduced nutrient, weed control (Singh, 2005). Mulches promote crop development, early yield as found by (Adekalu *et al*., 2008).

Frank and Heineman, (1987) displayed that the warmest temperatures were observed under clear plastic mulch and the coolest under the black plastic mulch

CONCLUSION

Established on the investigation results, it could be fixed that plastic mulches and seaweed (Maxi Grow) effects on the growth, and yield of Eggplant, and clear plastic showed higher performance between the plastic mulches. Clear plastic mulch was increased the fruits yield/plant, fruit number, plant high, and dry weight. Black mulch gave high fruit weight. Regarding the effect of seaweed, the level of 60 $ml.l^{-1}$ provided high yield/plant, fruit diameter, fruit weight, number of branches, yield kg/m^2 Therefore, the farming of Eggplant using clear plastic mulch and black. The hybrid Vivo was better then Anomoro in maximum characteristics .

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ثوختة

ئه ڤ ڤه كولينه يا هاتيه ئه نجام دان ل سه نتەرێ ڤه كولينيێن چاندنێ ل مالتا –دهوك لسالا 2019 بيستانه كێ ڤه كرى دا بو كارتيكرنا داپوشينێ بنا يلونێ (بێ نايلون ,نايلونێ بێ ره نگ ,ونايلونێ ره ش) دگه ل زبلێ پئكهاتيێ ده ريايى ب خه ستيا (0 و30 مل/لتر ئو 60مل/لتر) لسه ر گه شا كه سكاتيێوبه رهه مێ دوو جورێن (بيژى) يێن باجان ره‌شك Anomoro)و (Vivo ئەنوڤورو و ڤيڤو

ئەنجام ديارده‌ت نايلونێ بێ ره‌نگ كارتێكرنا بشوپه‌وه‌رى لسه‌ر درێژيا به‌رى و تيرا به‌رى و ژمارا به‌رى وروو‌ه‌ك و به‌رهه‌مێ روو‌ه‌كه‌كى/كغم و به‌رهه‌م د ئێك هيكتاردا.

هه‌روه‌سا نايلونئ ره‌ش سه‌ركه‌فتى بو د سه‌نگيا به‌رهه‌مى دا ئو زبلێ ئورگانيك ب خه‌ستيا 60 مل/لتر باشترين ژمارا تاكا دا و به‌رهه‌م/روو‌ه‌ك ئو به‌رهه‌م/هكتار(تون/هكتار)

هه‌روه‌سا خه‌ستيا 30 مل/لتر بو ئه‌گه‌رێ زێده‌كرنا به‌رى/روو‌ه‌ك