Sand Culture

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Introduction:

Plant Nutrition: is the study of the chemical elements and compounds that are necessary for plant growth, and also of their external supply and internal metabolism. two criteria defined for an element to be essential for plant growth:

*in its absence the plant is unable to complete a normal life cycle or that the element is part of some essential plant constituent or metabolite.

* There are 14 essential plant nutrients. Carbon and oxygen are absorbed from the air while other nutrients including water are obtained from the soil. Plants must obtain the following mineral nutrients from the growing media.

the primary macronutrients: nitrogen (N), phosphorus (P), potassium (K)

the three secondary macronutrients: calcium (Ca), sulphur (S), magnesium (Mg)

The micronutrients/trace minerals: boron (B), chlorine (Cl), manganese (Mn), iron (Fe), zinc (Zn) copper (Cu), molybdenum (Mo), nickel (Ni).

The macronutrients are consumed in larger quantities and are present in plant tissue in quantities from 0.2% to 4.0% (on a dry matter weight basis). Micro nutrients are present in plant tissue in quantities measured in parts per million, ranging from 5 to 200 ppm, or less than 0.02% dry weight.

Most soil conditions across the world can provide plants with adequate nutrition and do not require fertilizer for a complete life cycle. However, man can artificially modify soil through the addition of fertilizer to promote vigorous growth and increase yield. The plants are able to obtain their required nutrients from the fertilizer added to the soil. A colloidal carbonaceous residue, known as humus, can serve as a nutrient reservoir. Besides lack of water and sunshine, nutrient deficiency is a major growth limiting factor.

* Nutrient uptake in the soil is achieved by cataion exchange, where root hairs pump hydrogen ions (H+) into the soil through proton pumps. These hydrogen ions displace cations attached to negatively charged soil particles so that the cations are available for uptake by the root.

*Plant nutrition is a difficult subject to understand completely, partially because of the variation between different plants and even between different species or individuals of a given clone. An element present at a low level may cause deficiency symptoms, while the same element at a higher level may cause toxicity. Further, deficiency of one element may present as symptoms of toxicity from another element. An abundance of one nutrient may cause a deficiency of another nutrient.

-Materials and methods:

Plant material:

*Seedlings of pepper and tomato were planted on 3/9/2014.

*Seedlings were planted in two types of culture , soilless culture and sand culture.

*In our experiment:

-in sand culture we were add chahem on tomato and pepper, and they make another experiment in sand culture and added cu with trace to tomato and pepper.

measurment of plant growth and development

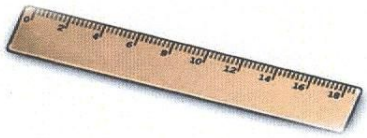
***Plant length, width, number of leaves number of flowers and fruits were measured weekly.**

***Fruits of pepper and tomato were harvested and the end of experiment and the total fruit weight were measured.**

*Fresh weight was measured at the end of the experiment and the dry weight was measured after drying of plant in oven on 100-103 for 24 hours.

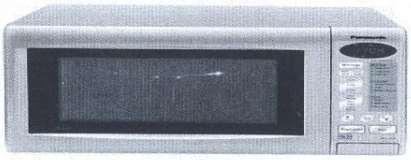
material use in the experiment

1. Meter



2. Caliber

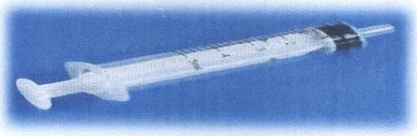
3. Oven



4. Balance

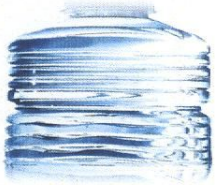
5. Sandy soil

6. syringe



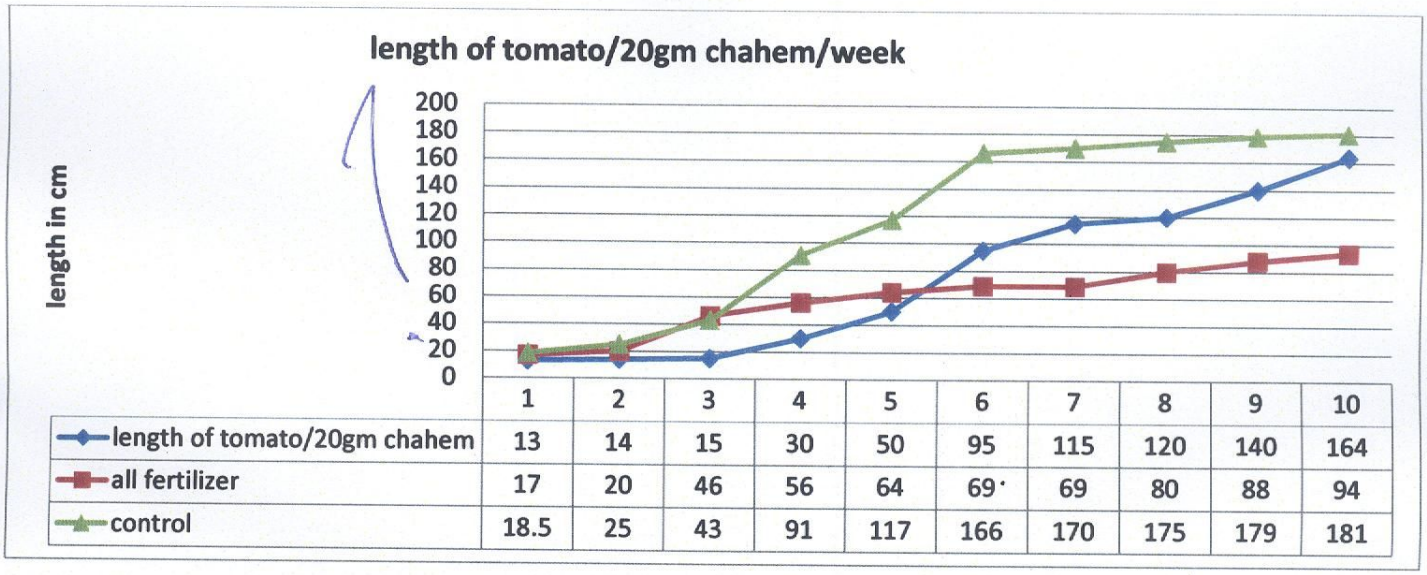
7. Bots

8. Source of water

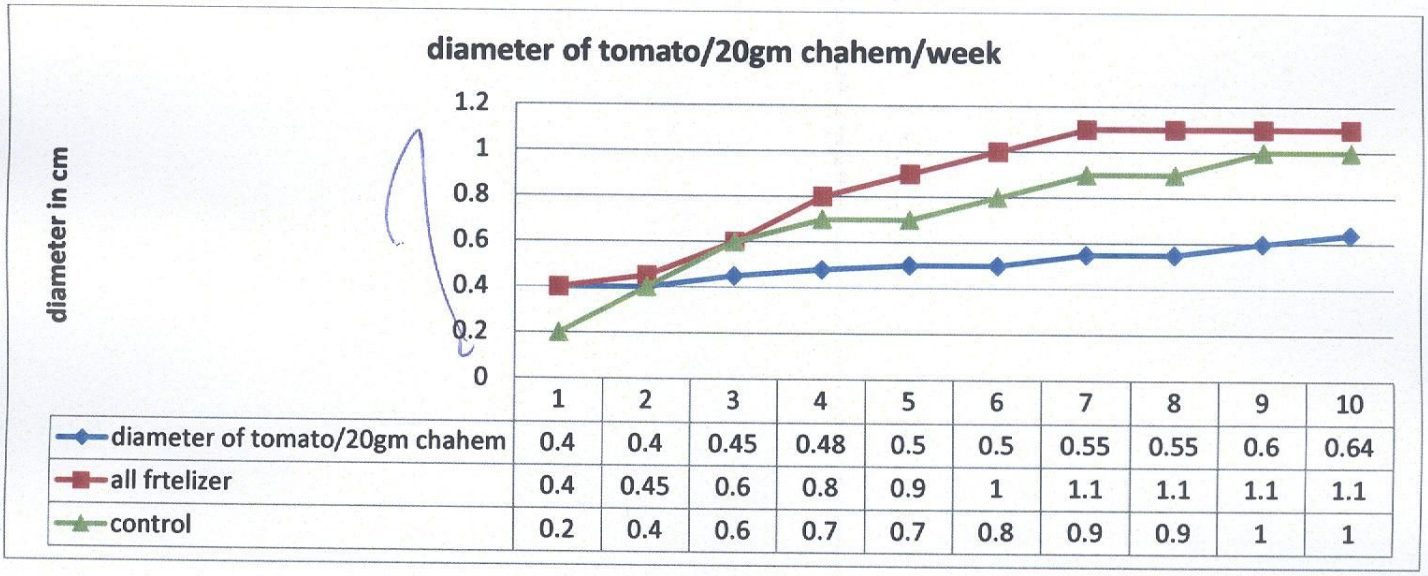


Result and discussion:

-Measurement of tomato with chahem fertilizer

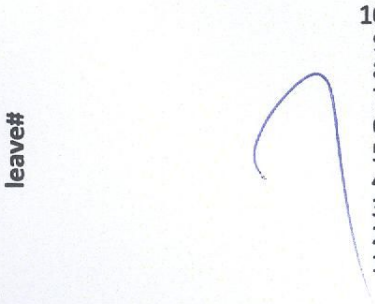


	1	2	3	4	5	6	7	8	9	10
length of tomato/20gm chahem	13	14	15	30	50	95	115	120	140	164
all fertilizer	17	20	46	56	64	69	69	80	88	94
control	18.5	25	43	91	117	166	170	175	179	181



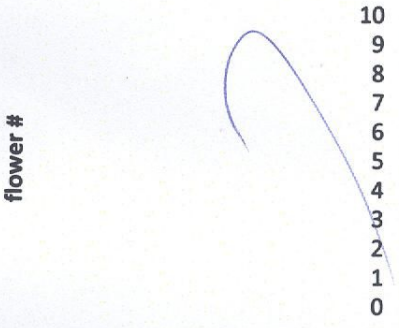
	1	2	3	4	5	6	7	8	9	10
diameter of tomato/20gm chahem	0.4	0.4	0.45	0.48	0.5	0.5	0.55	0.55	0.6	0.64
all frtelizer	0.4	0.45	0.6	0.8	0.9	1	1.1	1.1	1.1	1.1
control	0.2	0.4	0.6	0.7	0.7	0.8	0.9	0.9	1	1

leave of tomato/20gm chahem/week



	1	2	3	4	5	6	7	8	9	10
leave of pepper/20gm chahem	9	10	11	15	16	20	31	32	40	49
all fertilizer	32	42	58	58	59	61	70	72	88	90
control	8	12	20	41	49	56	58	55	51	52

flower of tomato/20gm chahem/week

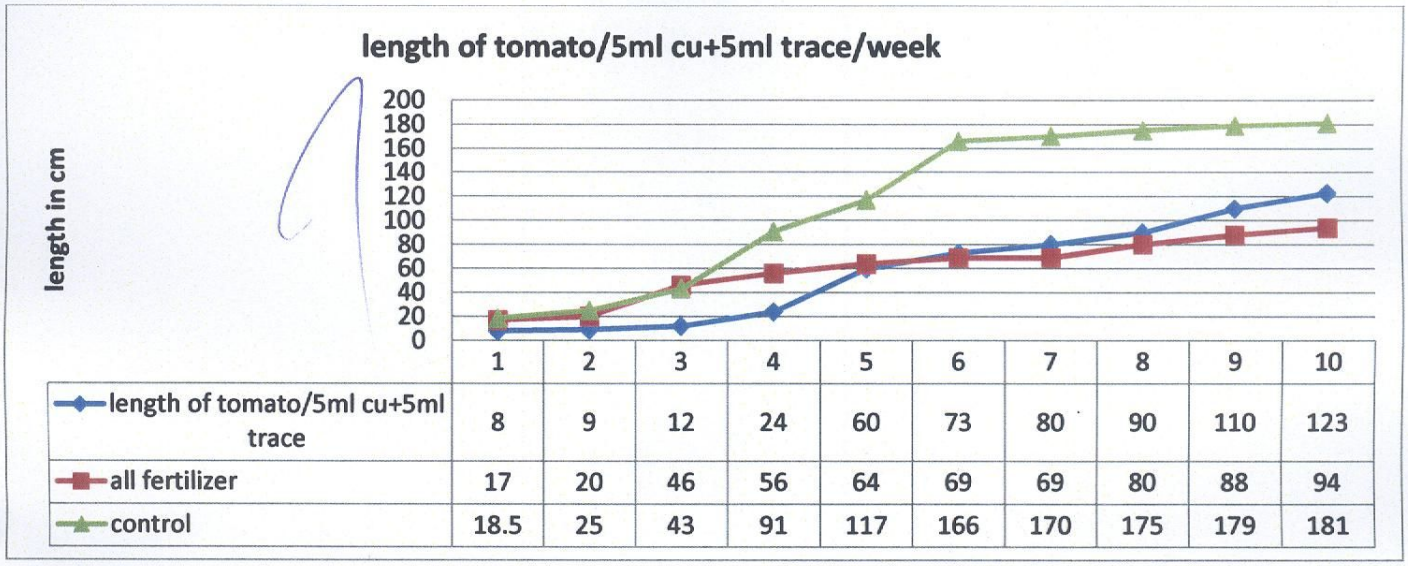


	1	2	3	4	5	6	7	8	9	10
flower of pepper/20gm chahem	0	4	5	3	3	4	4	4	5	3
all fertilizer	0	0	0	0	4	7	6	9	7	7
control	0	0	1	6	3	3	1	0	0	0

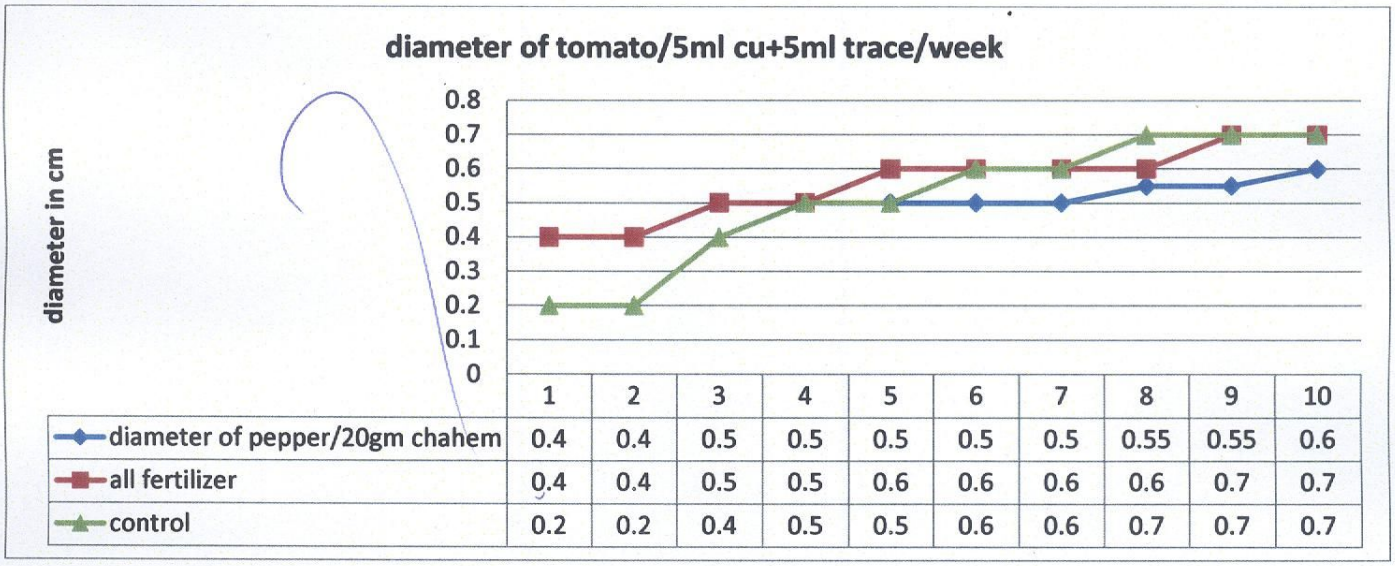
fruit of tomato/20gm chahem/week

	1	2	3	4	5	6	7	8	9	10
fruit of pepper/20gm chahem	0	0	0	1	2	2	3	3	3	3
all fertilizer	0	1	3	5	5	5	5	7	7	7
control	0	0	0	1	5	6	6	6	6	6

-Measurement of tomato with cu+trace fertilizer

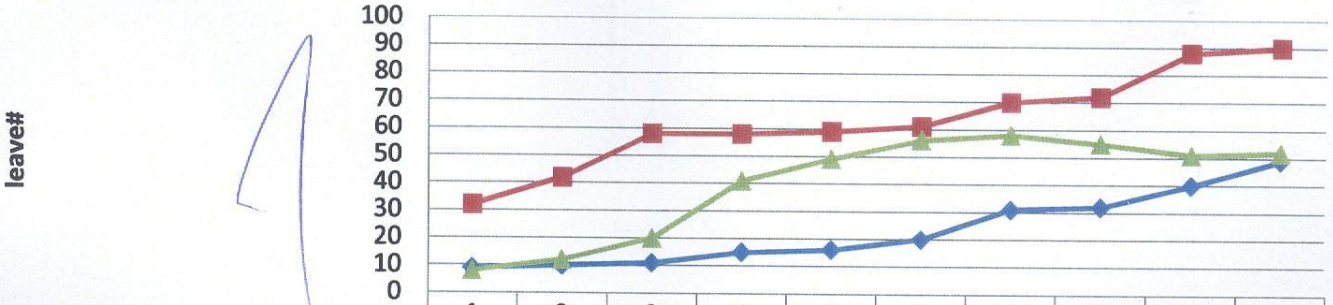


	1	2	3	4	5	6	7	8	9	10
length of tomato/5ml cu+5ml trace	8	9	12	24	60	73	80	90	110	123
all fertilizer	17	20	46	56	64	69	69	80	88	94
control	18.5	25	43	91	117	166	170	175	179	181



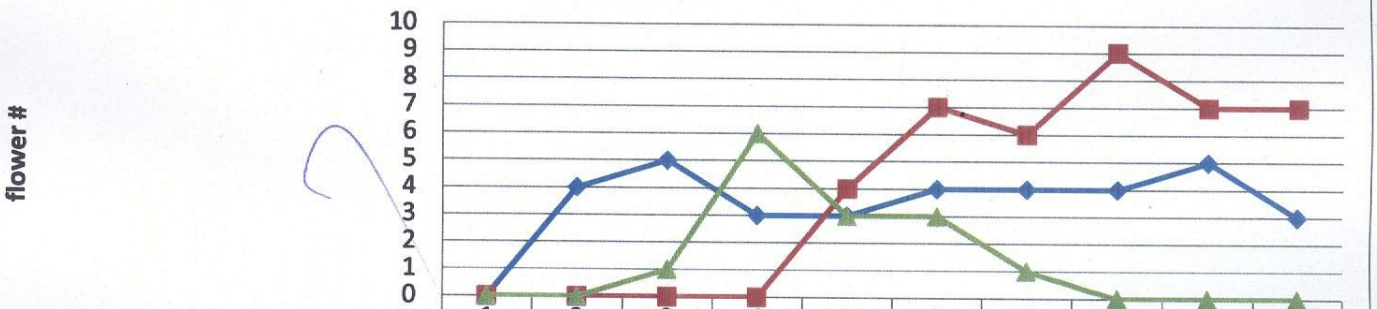
	1	2	3	4	5	6	7	8	9	10
diameter of pepper/20gm chahem	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.55	0.55	0.6
all fertilizer	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7
control	0.2	0.2	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7

leave of tomato/5ml cu+5ml trace/week



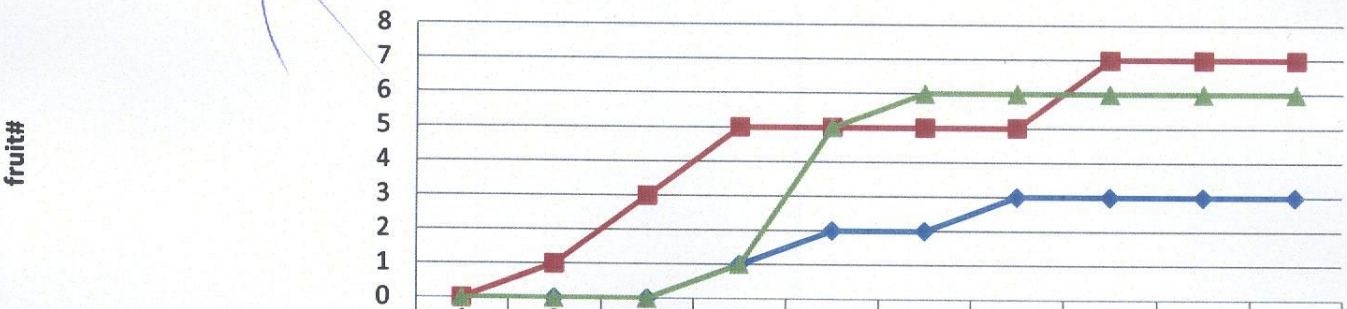
	1	2	3	4	5	6	7	8	9	10
leave of pepper/20gm chahem	9	10	11	15	16	20	31	32	40	49
all fertilizer	32	42	58	58	59	61	70	72	88	90
control	8	12	20	41	49	56	58	55	51	52

flower of tomato/5ml cu+5ml trace/week

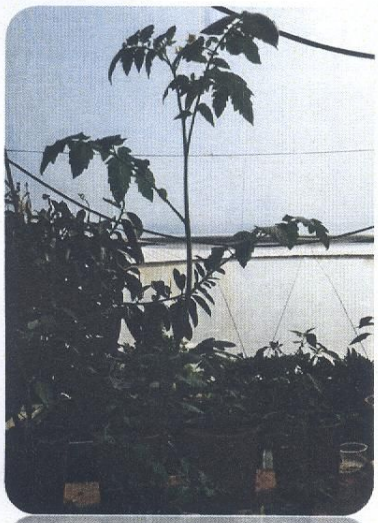


	1	2	3	4	5	6	7	8	9	10
flower of pepper/20gm chahem	0	4	5	3	3	4	4	4	5	3
all fertilizer	0	0	0	0	4	7	6	9	7	7
control	0	0	1	6	3	3	1	0	0	0

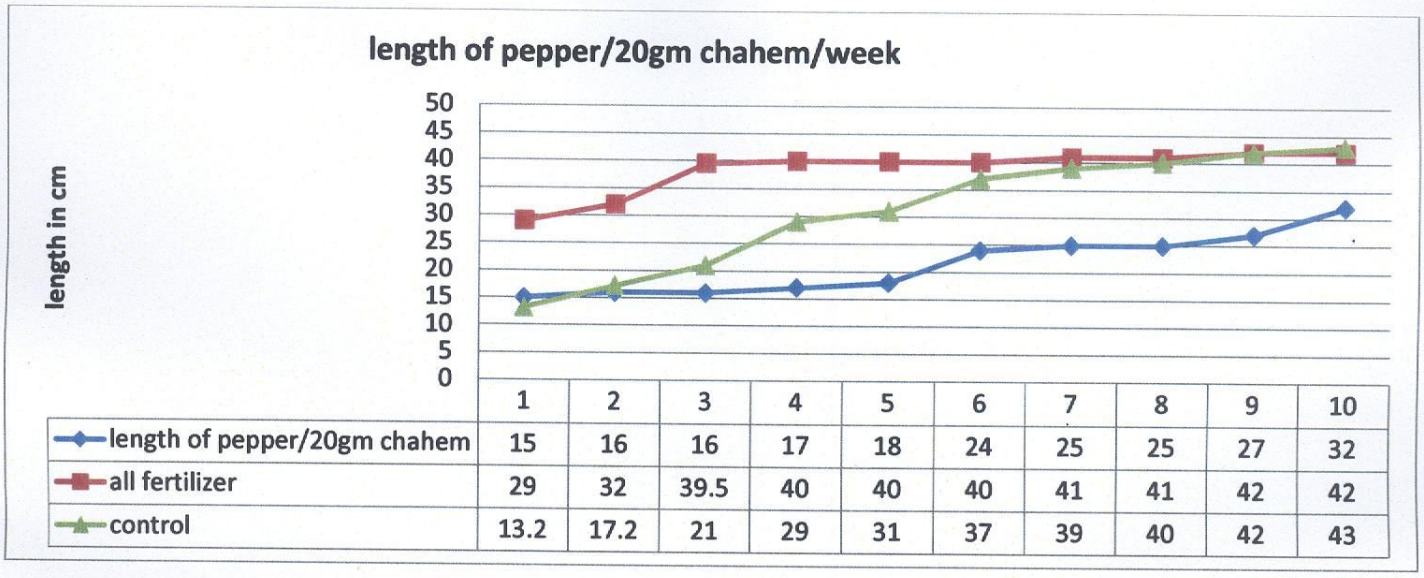
fruit of tomato/5ml cu+5ml trace/week



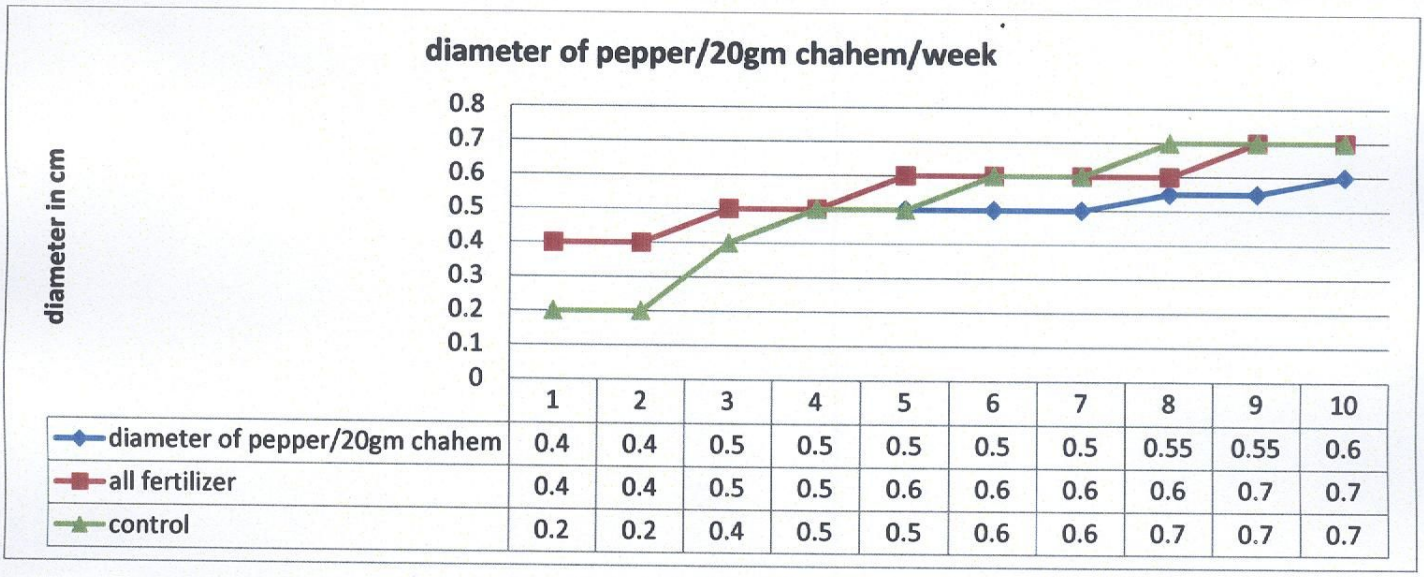
	1	2	3	4	5	6	7	8	9	10
fruit of pepper/20gm chahem	0	0	0	1	2	2	3	3	3	3
all fertilizer	0	1	3	5	5	5	5	7	7	7
control	0	0	0	1	5	6	6	6	6	6



-Measurement of pepper with chahem fertilizer

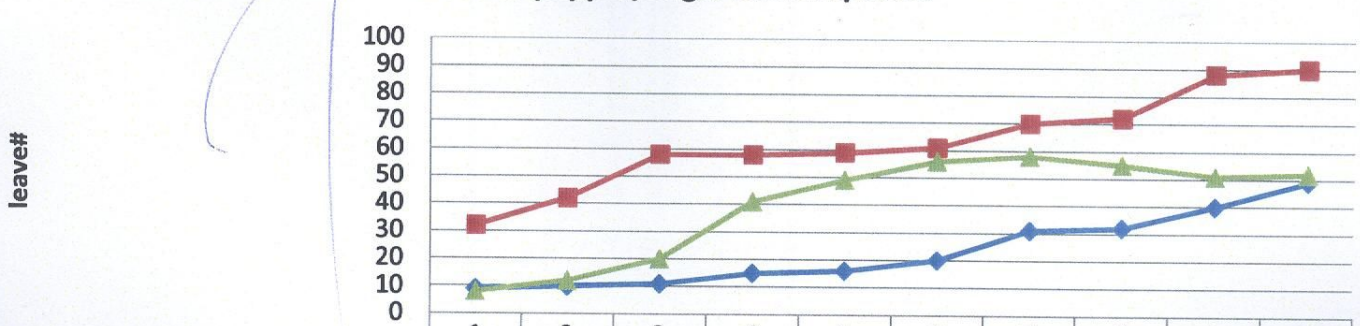


	1	2	3	4	5	6	7	8	9	10
length of pepper/20gm chahem	15	16	16	17	18	24	25	25	27	32
all fertilizer	29	32	39.5	40	40	40	41	41	42	42
control	13.2	17.2	21	29	31	37	39	40	42	43



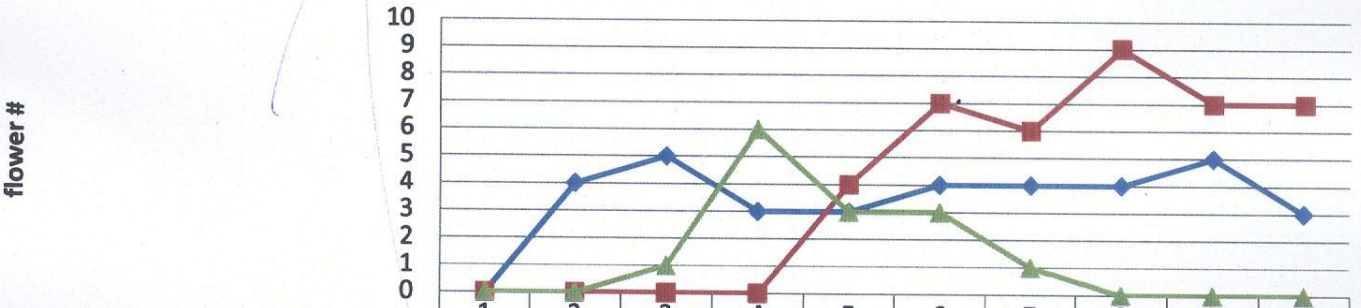
	1	2	3	4	5	6	7	8	9	10
diameter of pepper/20gm chahem	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.55	0.55	0.6
all fertilizer	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7
control	0.2	0.2	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7

leave of pepper/20gm chahem/week



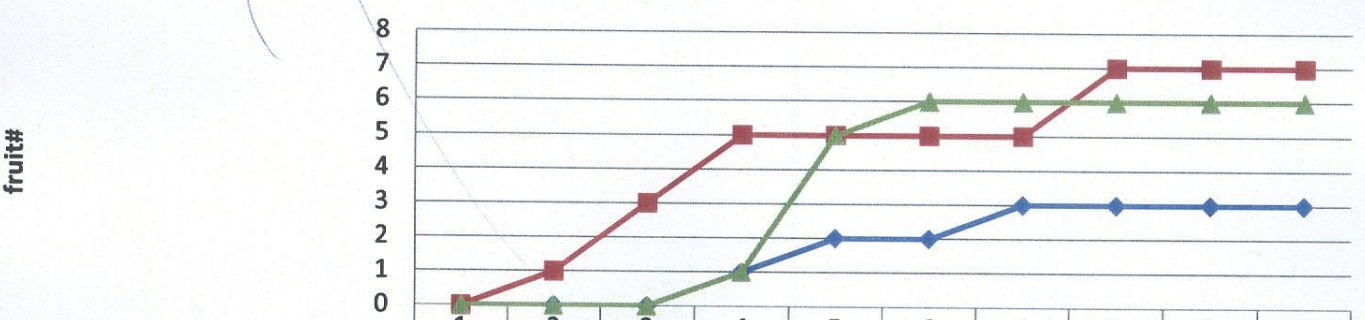
	1	2	3	4	5	6	7	8	9	10
leave of pepper/20gm chahem	9	10	11	15	16	20	31	32	40	49
all fertilizer	32	42	58	58	59	61	70	72	88	90
control	8	12	20	41	49	56	58	55	51	52

flower of pepper/20gm chahem/week



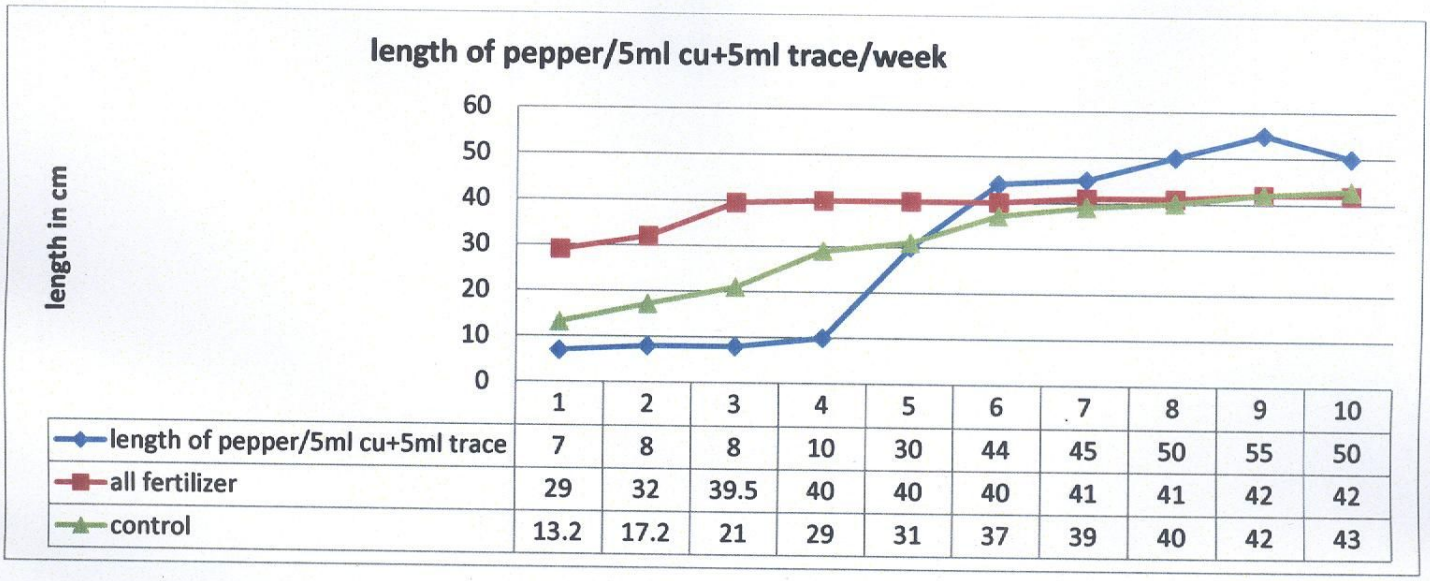
	1	2	3	4	5	6	7	8	9	10
flower of pepper/20gm chahem	0	4	5	3	3	4	4	4	5	3
all fertilizer	0	0	0	0	4	7	6	9	7	7
control	0	0	1	6	3	3	1	0	0	0

fruit of pepper/20gm chahem/week

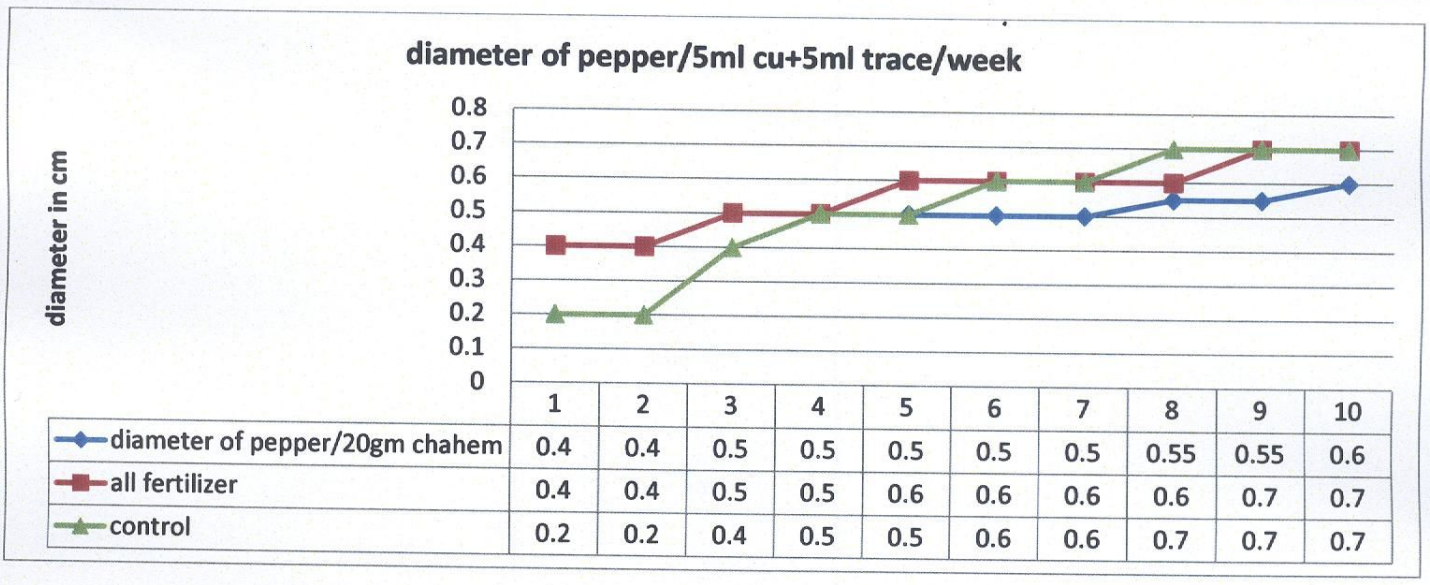


	1	2	3	4	5	6	7	8	9	10
fruit of pepper/20gm chahem	0	0	0	1	2	2	3	3	3	3
all fertilizer	0	1	3	5	5	5	5	7	7	7
control	0	0	0	1	5	6	6	6	6	6

-Measurement of pepper with cu+trace fertilizer

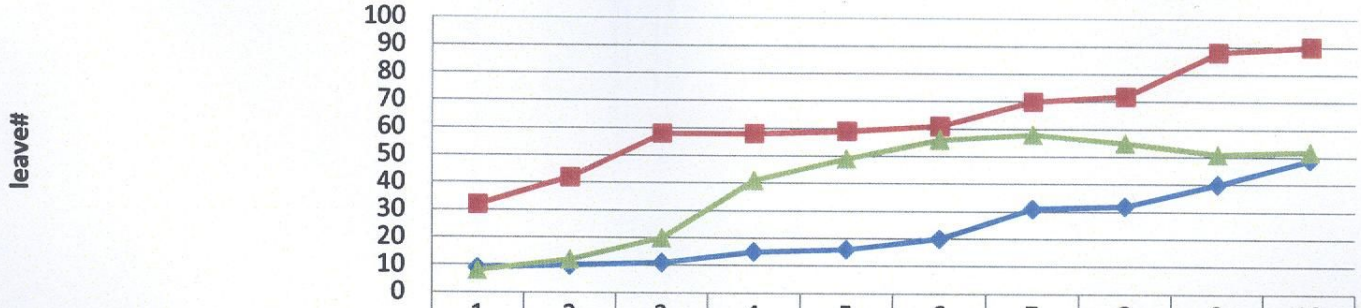


	1	2	3	4	5	6	7	8	9	10
length of pepper/5ml cu+5ml trace	7	8	8	10	30	44	45	50	55	50
all fertilizer	29	32	39.5	40	40	40	41	41	42	42
control	13.2	17.2	21	29	31	37	39	40	42	43



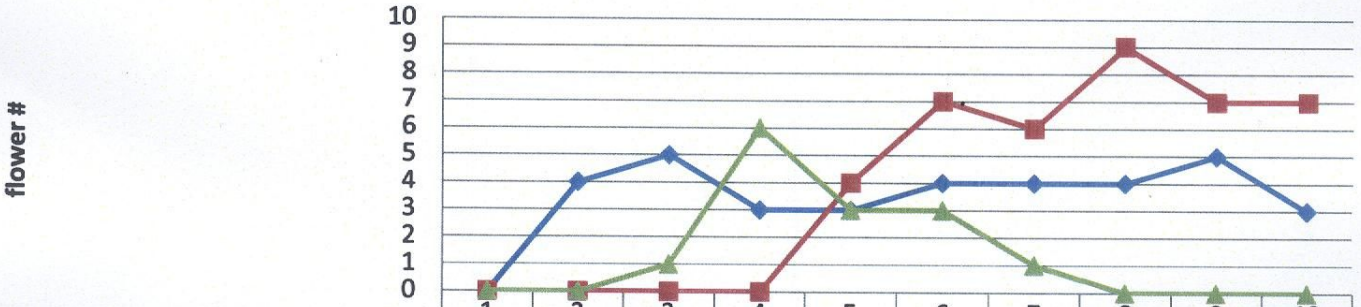
	1	2	3	4	5	6	7	8	9	10
diameter of pepper/20gm chahem	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.55	0.55	0.6
all fertilizer	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7
control	0.2	0.2	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7

leave of pepper/5ml cu+5ml trace/week



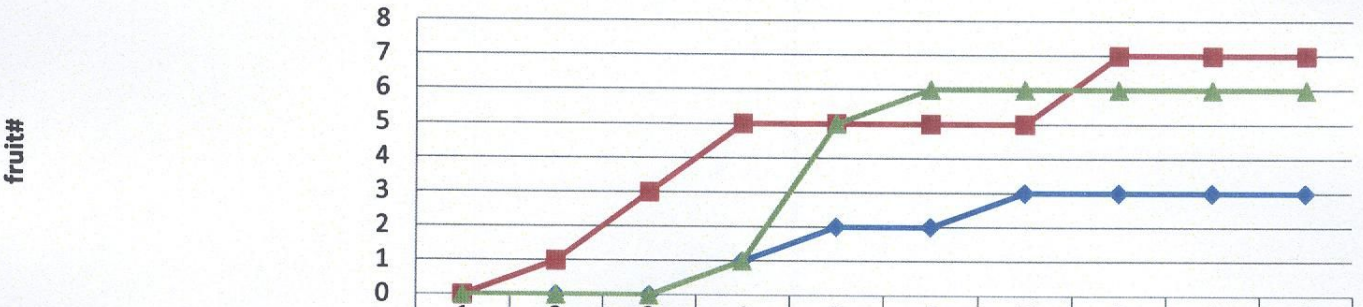
	1	2	3	4	5	6	7	8	9	10
leave of pepper/20gm chahem	9	10	11	15	16	20	31	32	40	49
all fertilizer	32	42	58	58	59	61	70	72	88	90
control	8	12	20	41	49	56	58	55	51	52

flower of pepper/5ml cu+5ml trace/week

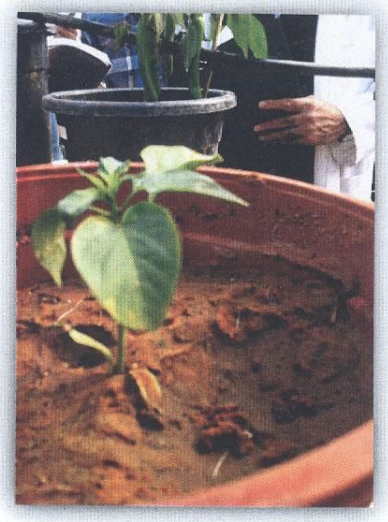


	1	2	3	4	5	6	7	8	9	10
flower of pepper/20gm chahem	0	4	5	3	3	4	4	4	5	3
all fertilizer	0	0	0	0	4	7	6	9	7	7
control	0	0	1	6	3	3	1	0	0	0

fruit of pepper/5ml cu+5ml trace/week



	1	2	3	4	5	6	7	8	9	10
fruit of pepper/20gm chahem	0	0	0	1	2	2	3	3	3	3
all fertilizer	0	1	3	5	5	5	5	7	7	7
control	0	0	0	1	5	6	6	6	6	6



experiment								Controlled			
tomato				pepper				tomato		pepper	
chahem		Cu+trace		chahem		Cu+trace		All fer.(n.p.k)		All fer.(n.p.k)	
fresh	dry	fresh	dry	fresh	dry	fresh	dry	fresh	dry	fresh	dry
159.5gm	34gm	93.2gm	21gm	24gm	4gm	30.5gm	6gm	135.4gm	115.3gm	29.9gm	14.1gm

experiment								Controlled			
tomato				pepper				tomato		pepper	
chahem		Cu+trace		chahem		Cu+trace		All fer.(n.p.k)		All fer.(n.p.k)	
No.fruit	Fruit wt.	No.fruit	Fruit wt.	No.fruit	Fruit wt.	No.fruit	Fruit wt.	No.fruit	Fruit wt.	No.fruit	Fruit wt.
0	0gm	0	0gm	3	25gm	3	121gm	4	202.4gm	7	135.2gm

Conclousion and analysis:

Our analysis of the experiment on transplant of tomato and transplant of pepper when adding different fertilizer each as when adding chahem and adding cu + trace to experiment control to transplant of tomatoes and peppers have noticed that both the length and the diameter and number of flowers, leaves and fruits are different from Add chacem for transplant of tomatoes and peppers the others as each of them has an impact on tomatoes pepper and noticed that he appeared deficiency symptoms on some papers and because of a defect in the drain or the problems of the control or that some fertilizer additives affect the length, diameter and number of fruits and leaves.