FERTIGATION TIMING AND VERMICOMPOST AFFECT VEGETATIVE GROWTH OF STRAWBERRY (*FRAGARIA×ANANNASA* DUCH.)

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The production of cultivated Strawberry (*Fragaria* × *ananassa* Duch.)

Rapidly increasing in Caspian Sea region of Iran in recent years.

maritime climate provides an excellent environment for strawberry production.

Most farmers are using black plastic mulch for controlling weeds and fruits rot in open fields..

These drip irrigation systems can be used to supply fertilizer.


TURKEY
N Iran
ARM.
AZER.
Caspian Sea
TURKMENISTAN
Ashgabat
Tabriz
Orūmīyeh
Rasht
Qazvin
Mashhad
SYR.
Tehran
Rey
Hamadān
Qom
Kermānshāh
IRAQ
IRAN
AFG.
Baghdad
Eşfahān
Qomsheh
Yazd
Ahvāz
Abadān
Kermān
Zahedān
KUW.
Kuwait
Shīrāz
PAK.
Bam
SAUDI ARABIA
Persian Gulf
Bandar-e 'Abbās
U.A.E.
0 100 200 mi
0 100 200 km
45°
50°
55°
60°
30°
35°
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Soilless strawberry cultivation

- very limited in Iran
- interest in soilless strawberry culture system is at a research and development phase.
- in addition to control soilborne diseases, soilless culture systems has other advantages such as;

greater yield, saving energy consumption, precise control of water, nutrients and other environmental conditions

- it is possible in soilless culture to grow more plants in a limited space.

Fertigation

Supplying crops with fertilizers through irrigation water,

An excellent method

for

- controlling timing,
- amount
- concentration

Vermicomposting

A process related to composting which can improve the beneficial utilization of organic wastes is vermicomposting.

It is a non-thermophilic process by which organic materials are converted by earthworms and microorganisms into rich soil amendments with greatly increased microbial activity and nutrient availability.

The effects of vermicomposts on plants are;

- attributed to the quality of mineral nutrition
- increasing microbial activity and microbial biomass which are key components in nutrient cycling,
- production of plant growth regulators
- protecting plants soil-borne disease and arthropod pest attacks.

This study was conducted to evaluate the effect of four fertigation timing and the application of different rates of vermicompost and compost on vegetative growth of Camarosa strawberry plants in a pot experiment.

Strawberries

Raised beds, polythene mulch, trickle line + fertigation

Production in soil-less media

Substrate System in Pots under Tunnels

Camarosa is recommended for annual system

Use the annual plasticulture production system.

Plants can be planted in tunnel late in September.

Use plug plants or fresh-dug green top plants

Harvest can be 2 -4 weeks earlier than open field

Still need to be concerned with low temperature bud and flower damage

Pollinators are recommended

Plant Material Types

Dormant bare-rooted

Fresh dug bare-rooted, green top

Plug plants, tray plants

Runner tips

Waiting plants (dormant multi-crown)

At the beginning of experiment, all media were sampled and analyzed for the absorbable nitrogen, phosphorus and potassium were measured.

	(٪) K	(٪) P	(٪) N	Organic matter(٪)	Organic Carbon(٪)	EC mS/m	pH
Vermicompost	0.333	0.449	1.44	24.74	14.35	0.702	7.05
Cattel manur	0.372	0.814	1.34	23.07	13.35	2.34	7.50
Coco-peat	0.628	0.054	3.84	66.2	38.40	2.17	5.80
Perlite	0	0	0	0	0	0.141	7.36

At the beginning of experiment, all media were sampled and analyzed for pH, electric conductivity (EC) . their bulk density, and hydraulic capacity

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Media	Hydraulic capacity	Porosity	Bulk density	pH	ES
	(%)	(%)	(gr/cm^3)		µS/cm
Peat and perlite	8.30	51	0.08	7.40	347
40% vermicompost	4.30	12	0.17	7.14	644
20% vermicompost	4.84	12	0.15	7.39	594
10% vermicompost	7.48	10	0.07	7.34	508
40% compost	4.81	15	0.16	7.30	965
20% compost	6.09	16	0.13	7.32	860
10% compost	7.23	18	0.10	7.09	800

Strawberry cultivar Camarosa, plants
derived from second-order daughter
fresh-dug plantlets
transplanted on mid Nov. into 4 L pots
filled with seven soilless media treatments;
a peat + perlite (1:1) base medium,
supplemented with 10%, 20% and 40% vermicompost
10%, 20% and 40% cattle manure
in combination with four fertilization timings:
fall, spring, fall + spring and no fertigation.

Cattel manure and commercially produced cattel manure-based vermicomposts were used in this study.

During the experiment, depending on nutritional treatments plants were irrigated with a complete fertilizer NPK (20-20-20) with a pH 8/5 at about 250 to 300 ml by the manual method twice weekly. No fungicides or insecticides were used.

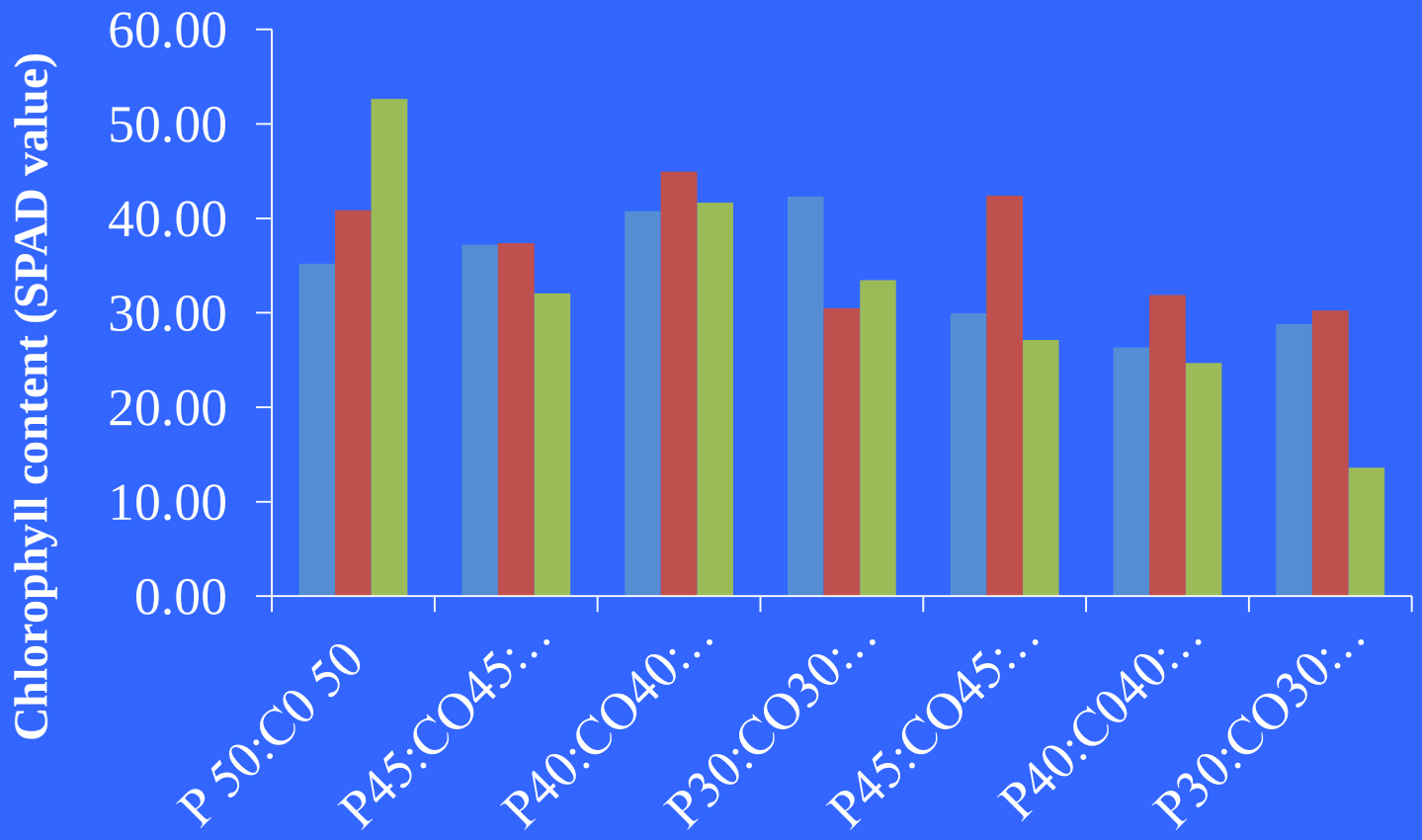
After 98 days, measurements such as leaf area, chlorophyll content (number SPAD) (SPAD-502, Minolta, Japan),

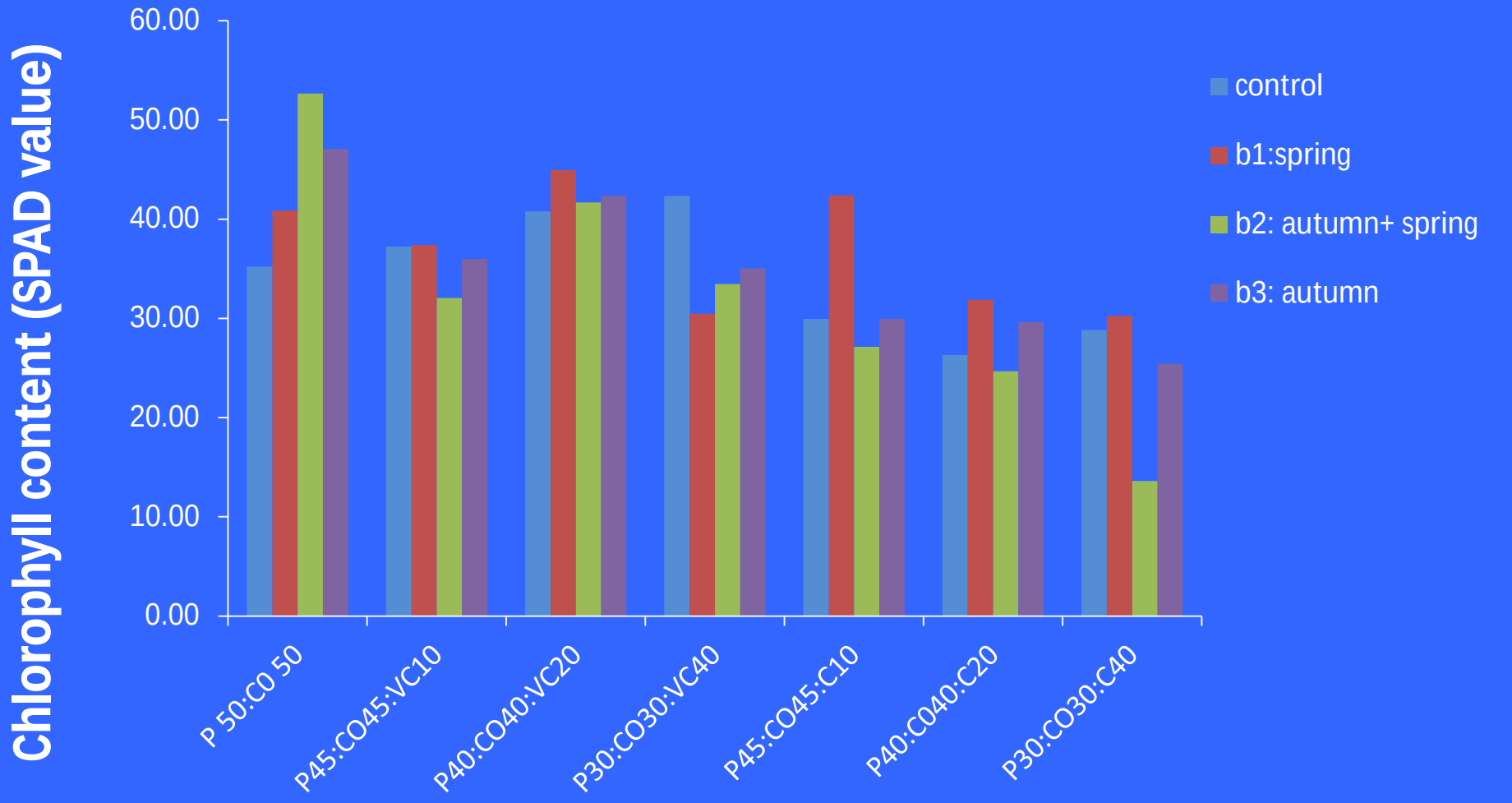
Petiole length, petiole diameter, crown diameter and leaf number were measured.

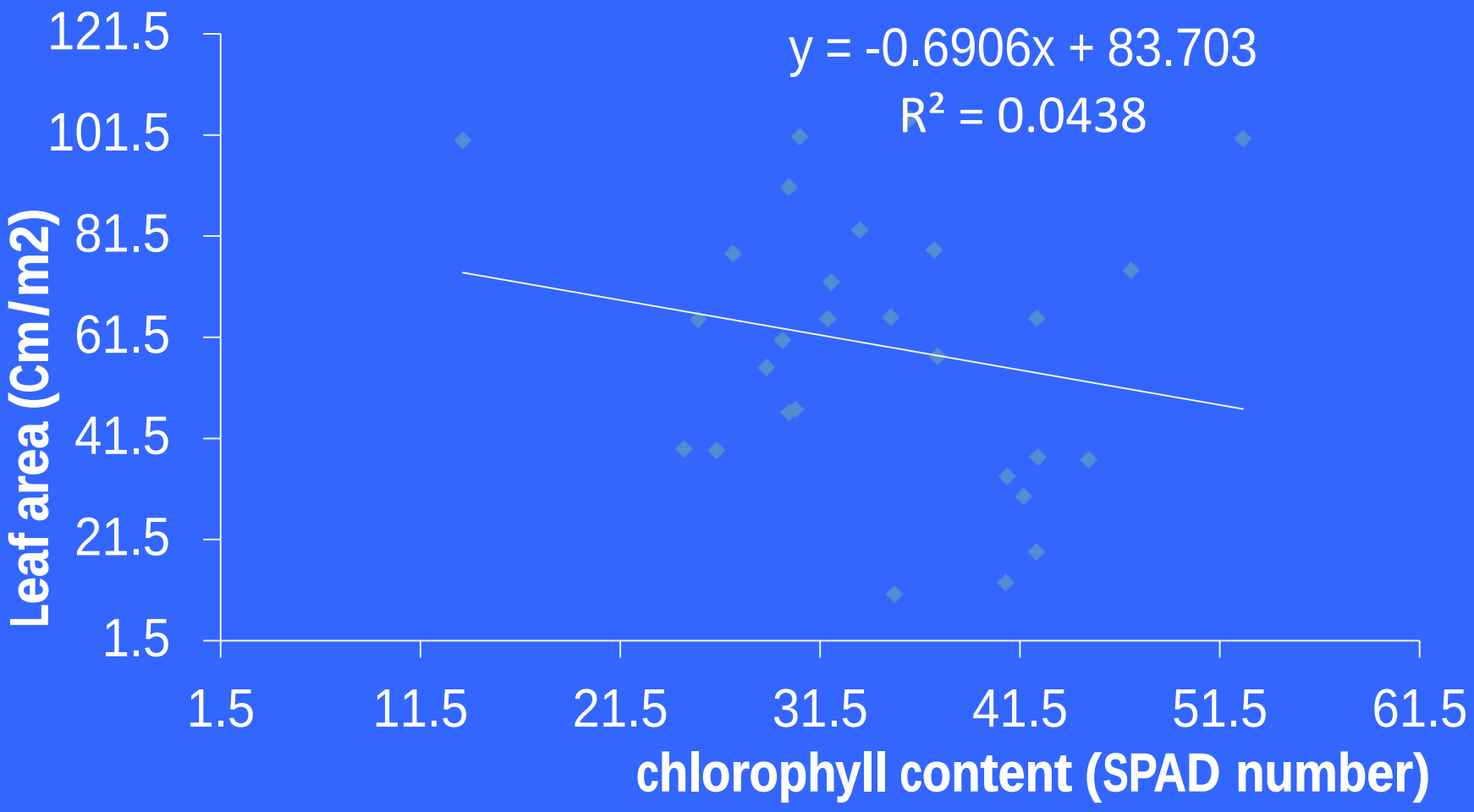
The test data obtained by using 9.1 SAS software to analyze and compare the mean differences and the least significant test (LSD) were performed at 5% level. The corresponding graphs were plotted using Excel software

Table 1. Chlorophyll content, Number of leaves, Crown diameter, Petiole length, Petiole diameter, leaf areas of strawberries grown in media supplemented with different organic amenments, inorganic fertigation timing and their interaction, 98 days after transplanting

Sources of variations	Degree of freedom	Chlorophyll content	Number of leaves	Crown diameter	Petiole lenght	Petiole diameter	Leaf area
Media (A)	6	100.58**	2.08*	7.45*	173.04**	0.19**	6290.55**
Fertigation (B)	3	132.26*	17.73**	29.50**	326.08**	0.56**	15686.07**
A × B	18	148.24**	26.01*	15.49**	123.88**	0.12*	3957.77
Experimental error	112	48.18	0.75	3.25	46.38	0.06	397.11
Coefficient of variation		20.0	26.6	22.4	21.6	15.81	28.34


Chlorophyll content (SPAD value)
60.00
50.00
40.00
30.00
20.00
10.00
0.00
P 50:C0 50
P45:CO45:…
P40:CO40:…
P30:CO30:…
P45:CO45:…
P40:C040:…
P30:CO30:…


Chlorophyll content (SPAD value)
60.00
50.00
40.00
30.00
20.00
10.00
0.00
P 50:C0 50
P45:CO45:VC10
P40:CO40:VC20
P30:CO30:VC40
P45:CO45:C10
P40:C040:C20
P30:CO30:C40
control
b1:spring
b2: autumn+ spring
b3: autumn


y = -0.6906x + 83.703
R² = 0.0438
121.5
101.5
81.5
61.5
41.5
21.5
1.5
Leaf area (Cm/m2)
1.5
11.5
21.5
31.5
41.5
51.5
61.5
chlorophyll content (SPAD number)

Conclusion,

The future of strawberry soilless cultivation in Iran depends on the development of a production system that is profitable in comparison with open-filed strawberry production. Furthermore, it would be possible to extend strawberry production to areas that traditionally considered unsuitable for open field strawberry culture. Therefore, more research is needed to develop environmentally and economically sustainable strawberry soilless production system.