Himachal Journal of Agricultural Research 40(2):132-136 (2014)

Effect of locally available potting mixture on nursery raising of summer squash (*Cucurbita pepo* Linn.) under organic conditions

Sanjay Chadha, Rameshwar, Surender Sharma and J.P. Saini
Department of Organic Agriculture
CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176 062, India.

Manuscript Received: 10.01.2014; Accepted: 01.04.2014

Abstract

A study entitled "effect of locally available potting mixture on nursery raising of summer squash (*Cucurbita pepo* Linn.) under organic conditions" was carried out at Model Organic Farm of the Department of Organic Agriculture, CSK HPKV, Palampur during 2011. Eight different treatments of local organic potting materials were tested for their suitability for growing seedlings of summer squash in thermocol glasses of 150 ml capacity. The treatments were laid out in CRD with three replications. The same set of experiment was repeated thrice over three sowing dates at one month interval under protected structure *i.e.*, 20th January 2011 (first sowing), 22nd February 2011 (second sowing) and 22nd March 2011 (third sowing) . The pooled analysis over three sowing dates showed that the potting mixture comprising of two parts vermicompost + one part soil + one part sand + one fourth part wood ash was found to be the best organic material for growing the seedlings of summer squash. This potting material produced 91.78 percent healthy seedlings for transplanting, which could be easily pulled out with intact rooting mixture from the thermocol glasses. Small thermocol glasses can be used as an alternative to pro/plug trays or polythene bags as potting base for growing individual seedlings of cucurbits. It can be an affordable, cheaper and easily available technology for nursery raising of cucurbits in the country like India where majority of the farmers are small and marginal.

Key words: Potting mixture, organic nursery, summer squash, potting base.

Introduction

Summer squash (*Cucurbita pepo* Linn.) is one of the most important cucurbitaceous crops gaining popularity as an off-season crop in Himachal Pradesh. Summer squash can be raised either by direct seeding or by transplanting. However, direct seeding is not practicable as the temperature outside in open field conditions is very low, which hinders seed germination. Moreover, delay in seed sowing of summer squash often experiences heavy infestation of fruit fly. For raising an off-season crop of summer squash, seedlings should be grown inside polyhouse during January and February months (Sharma, 1998). For raising seedlings, farmers are using either polybags or plug/pro-trays. Now a day, farmers of the state are getting difficulty in raising the seedlings of different cucurbits due to ban on polythene by Himachal Pradesh Government (Anonymous, 2004) and non-availability *vis-à-vis* high prices of plug/pro-tray as well as potting mixture (comprising of cocopeat, vermicultite and perlite). In Himachal Pradesh, 84.5% of the total holdings belong to small and marginal farmers and operating only on 47.1% of cultivable land (Anonymous, 2004-05). This vast segment of the hilly farming community of the state comprising of small and marginal farmers, often find it difficult to access costly inputs. Therefore, an attempt has been made in the present study to develop an alternate cheap technology available at doorstep and to standardized the suitable time to get healthy seedlings and escapes pest infestation to farming community for raising seedling of cucurbitaceous crops.

Materials and Methods

The present study was carried out at Model Organic Farm of the Department of Organic Agriculture, CSK HPKV, Palampur during 2011. As an alternate to plug/pro-trays or polythene bags, the thermocol glasses were used as base for raising the seedlings of summer squash (variety: Pusa Alankar). A hole was made at the base of thermocol glasses to drain-out excess water. The treatments were laid out in completely randomized design (CRD) with three replications and three sowing dates *viz.*, 20th January 2011 (first sowing), 22nd February 2011 (second sowing) and 22nd March, 2011 (third sowing). The experimental material consisted of 8 treatments comprising of different potting mixture of locally available material. The eight treatments were T_1: vermicompost + saw dust (1:1), T_2: vermicompost + saw dust + sand (1:1:1), T_3: vermicompost + saw dust + sand + wood ash (1:1:1:¼), T_4: vermicompost + soil + sand (1:1:1), T_5: vermicompost + soil + sand + wood ash (2:1:1:¼), T_6: vermicompost + soil + saw dust: sand + wood ash (2:1:1:1:¼), T_7: vermicompost + soil + saw dust (2:1:1) and T_8: vermicompost + soil + saw dust + ash (2:1:1:1:¼). Ten thermocol glasses of 150 ml capacity were filled with each potting mixture and seed was sown in each replication and in each sowing date. The influence of different potting mixture was recorded on seed germination percentage, healthy plants available for transplanting (%) and seedlings pulled out with intact potting mixture.

Results and Discussion

Per cent seed germination

No significant differences for seed germination percentage has been observed among different treatments during all the three dates of sowing and pooled analysis (Table 1). However, seed germination percentage in pooled analysis varied from 89.56 (T_8: vermicompost + soil + saw dust + wood ash) to 97.11 per cent (T_5: vermicompost + soil + sand + wood ash).

Per cent healthy seedlings available for transplanting

The seedlings, which were having lush and dark green leaves with vigorous plant growth were marked as healthy seedlings and selected for transplanting, whereas, seedlings having dull light green with little yellowish colouration and stunted growth habit were not selected for transplanting. Significant differences among different treatments were observed for the availability of healthy seedlings for transplanting irrespective of all the dates of sowing and pooled analysis. The maximum percentage of healthy seedlings available for transplanting were recorded in T_5, i.e., 2 parts of vermicompost + one part of soil + one part of sand + one fourth part of wood ash to the tune of 97.33, 97.00 and 88.67 per cent in first, second and third sowing, respectively, whereas, on pooled basis 94.33 per cent healthy seedlings were available. The better growth of seedlings in T_5 might be because of the presence of wood ash, which is a good source of available phosphorus- a vital nutrient for root development (Lickacz, 2002), besides the problem of cadmium contents in using wood ash in potting mixture (Grant *et al.*,1998). The minimum percentage of healthy seedlings available for transplanting was recorded in $T_{1,}$ i.e., vermicompost + saw dust in equal proportion to the tune of 46.00, 37.33 and 48.67 per cent in first, second and third sowing, respectively. The corresponding figures in pooled analysis were 44.00 per cent (Table 2). The

Table 1. Effect of potting mixture on seed germination in summer squash

Sr. No.	Potting mixture	Ratio	Seed germination (%)			
			1st Sowing	2nd Sowing	3rd Sowing	4th Sowing
T_1	Vermicompost + Saw Dust	1:1	92.00 (9.44)	83.33 (9.18)	93.33 (9.71)	90.33 (9.56)
T_2	Vermicompost + Saw Dust + Sand	1:1:1	90.00 (9.53)	90.00 (9.53)	96.67 (9.88)	92.00 (9.64)
T_3	Vermicompost + Saw Dust + Sand + Ash	1:1:1:¼	93.33 (9.71)	93.33 (9.71)	90.00 (9.53)	93.33(9.71)
T_4	Vermicompost + Soil + Sand	1:1:1	95.00 (9.79)	90.00 (9.53)	86.67 (9.35)	91.89 (9.64)
T_5	Vermicompost + Soil + Sand + Ash	2:1:1:¼	97.33 (9.91)	100.0 (10.05)	93.33 (9.71)	97.11 (9.90)
T_6	Vermicompost + Soil + Saw Dust: Sand + Ash	2:1:1:1:¼	94.67 (9.78)	96.67 (9.88)	96.67 (9.88)	95.78 (9.84)
T_7	Vermicompost + Soil + Saw Dust	2:1:1	94.00 (9.74)	96.67 (9.88)	96.67 (9.88)	96.22 (9.86)
T_8	Vermicompost + Soil + Saw Dust + Ash	2:1:1:1:¼	87.33 (9.40)	90.00 (9.53)	90.00 (9.53)	89.56 (9.52)
CD (P=0.05)			NS	NS	NS	NS

The values in the parentheses are square root transformed values

other treatments, T_6, i.e., 2 parts of vermicompost + one part of soil + one part of saw dust + one part of sand + one fourth part of ash and T_4, i.e., one part each of vermicompost, soil and sand, gave 83.22 and 76.78 per cent of healthy seedlings for transplanting in pooled analysis, respectively.

Per cent seedlings pulling out with intact potting mixture

For transplanting of cucurbits, there should be minimum damage to the rooting system and the seedlings should be pulled out easily with intact potting mixture. This helps the seedlings to tolerate the transplanting shock in a much better way. Significant differences were observed for percentage of seedlings pulled out with intact potting mixture. On the basis of pooled analysis, the potting mixture comprising of two parts vermicompost + one part soil + one part sand + one fourth part wood ash (T_5) was found to be the best organic potting mixture for growing of seedlings of summer squash, which gave 91.78 per cent healthy seedlings, which could be easily pulled out with intact rooting mixture from the thermocol glasses. The range for this trait varied from 17.33 to 94.33 per cent (first sowing), 18.67 to 95.0 per cent (second sowing), 22.33 to 86.0 per cent (third sowing) and 19.44 to 91.78 per cent (pooled analysis) with minimum values in T_1 and maximum values were recorded in T_5 in all the environments (Table 2).

The soils of the mid hills are heavy in texture, therefore, the use of sand alonwith vermicompost as potting mixture gave better results due to increased aeration in potting mixture, which is an essential consideration for soil microflora. The use of wood ash not only acts as insect repellant but also has cohesive

Table 2. Effect of potting mixture on availability of healthy seedlings for transplanting (%) and healthy seedlings pulled out with intact potting mixture in summer squash

Sr. No.	Healthy seedlings available for transplanting (%)				Healthy seedlings pulled out with intact potting mixture (%)			
	1st Sowing	2nd Sowing	3rd Sowing	Pooled	1st Sowing	2nd Sowing	3rd Sowing	Pooled
T_1	46.00 (42.68)	37.33 (37.65)	48.67 (44.21)	44.00 (41.53)	17.33 (24.56)	18.67 (25.54)	22.33 (28.10)	19.44 (26.11)
T_2	58.00 (49.61)	54.67 (47.69)	58.33 (49.81)	57.00 (49.01)	22.33 (28.17)	35.67 (36.51)	33.67 (35.42)	30.56 (33.48)
T_3	61.33 (51.56)	67.67 (55.35)	56.67 (48.88)	61.89 (51.87)	37.00 (37.38)	34.33 (35.85)	39.33 (38.82)	36.89 (37.38)
T_4	78.67 (62.60)	78.67 (62.55)	73.00 (58.88)	76.78 (61.17)	69.33 (56.40)	64.33 (53.32)	62.00 (51.95)	65.22 (53.85)
T_5	97.33 (84.53)	97.00 (84.17)	88.67 (70.49)	94.33 (76.87)	94.33 (78.92)	95.00 (82.40)	86.00 (68.22)	91.78 (74.10)
T_6	84.00 (66.42)	89.00 (70.64)	76.67 (61.25)	83.22 (65.84)	62.67 (52.32)	81.00 (64.23)	70.00 (56.82)	71.22 (57.57)
T_7	47.67 (43.65)	52.67 (46.52)	52.67 (46.52)	51.00 (45.56)	34.00 (35.65)	42.33 (40.55)	42.67 (40.76)	39.67 (39.01)
T_8	68.33 (55.81)	63.33 (52.81)	59.00 (50.19)	63.56 (52.85)	47.67 (43.64)	37.67 (37.84)	39.33 (38.82)	41.56 (40.12)
CD (P=0.05)	8.98	8.71	8.49	4.54	7.66	9.78	5.02	5.36

The values in the parentheses are arc sine transformed values

properties which help in binding the potting mixture, which ultimately help in pulling the seedlings intact with the potting mixture from potting base.

Growing cucurbits seedlings in thrown out/used thermocol glasses is not only a cheap method of producing the seedlings of cucurbits, but can also help in mitigating the problem of environmental pollution caused by thermocol. These thermocol glasses if handled carefully can be used for growing the seedlings of cucurbits many times. This is an alternative method of growing the seedlings of cucurbits by small and marginal farmers of the country, who can not afford costly technology of growing the seedlings in pro-trays with potting mixture of cocopeat, vermiculite and perlite, which are also not easily available yet in the local markets.

Acknowledgement

The financial assistance received under Niche Area of Excellence Program "Organic Farming in Hill Agriculture" of Indian Council of Agricultural Research (ICAR) is duly acknowledged.

References

Anonymous 2004. Notification from the Secretary (IT, BT and S&T) to the Government of Himachal Pradesh on subject "Implementation of ban on polythene bags of certain dimensions with effect from 14.06.2004" vide Notification No. STEA(3)-4/2003 dated 04.06.2004

Anonymous 2004-05. Economic Survey, Ministry of Finance, Government of India.

Grant CA, Buckey WT, Bailey LD and Selles F 1998. Cadmium accumulation in crops. Can. J. Plant Sci. **73**:1-17.

Lickacz J 2002. Wood Ash- an Agricultural Liming material for Agricultural Soils. in: Agri-facts, febr.2002. Alberta/Canada

Sharma R 1998. Effect of planting dates and spacing on yield and yield attributes in summer squash (*Cucurbita pepo* L.). M Sc Thesis, Himachal Pradesh Krishi Vishvavidyalaya, Palampur (unpublished).