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Rainfed vegetable cultivation

M. PRABHU*, R. JAGADEESAN, V. BALASUBRAMANIAN[1] AND A. RAMESH KUMAR
Department of Spices and Plantation Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, COIMBATORE (T.N.) INDIA

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*** Author for correspondence.**
[1] Soil Survey and Land Use Organization, Lawley Road, COIMBATORE (T.N.) INDIA

field. Polymers are available in various colors; the suitable polymer colour should be selected for a particular seed to improve its physical appearance as well as the aesthetic values of the seed. The polymer products can be used as such or can be diluted with 1 to 4 parts of water as they contain excellent surfactants and spreaders and have a very quick drying time.

Eckenrode *et al.* (1973) also reported that it is often desirable to coat the seeds with chemicals such as fungicides and insecticides and for which various methods are currently employed such as the use of cellulose derivatives or polymers incorporating the biologically active chemicals as a wet treatment.

Growth regulators and chemicals:

Exogenous applications of natural plant hormones as well as synthetic plant growth regulators are known to improve the fruit set, yield and accelerate uniform ripening for easy harvest under rainfed conditions. Mepiquat chloride is a bio-regulator which promotes the reproductive phase of vegetable crops. It imparts dark green colour to the leaves and shortens internodal length. Under moisture stress potassium protects the plant by involving in the exchange of cytoplasmic potassium for stomatal hydrogen ions thus raising stomatal pH and facilitating photosynthesis. This spray significantly reduces transpiration rate, this may be due to increased stomatal resistance, which lead to conservation of moisture in the cells by maintaining high relative water content. Proline accumulation was also higher in potassium chloride, which helps to channalise the diversion of protein metabolism for withstanding drought.

Minimizing the transpiration losses by using anti-transpirants (Stomatal opening inhibitors *viz.,* PMA, Alkenyl succinic acids and Atrazine at low concentration, Film forming substances *viz.,* Mobi leaf, Hexadeconal and Silicons, Reflecting types *viz.,* kaoline, celite), growth retardants (application of cycocel reduces lodging and increases the yield) and wind breaks (Increasing the air resistance to water vapor).

Tomato:

The most sensitive periods of tomato plants to moisture stress are the flowering and fruit enlargement stages. The desirable traits for rainfed varieties (Table 1) are reduced leaf area, production of more assimilates, high level of abscissic acid and increased fruit set. The maximum importance is given for osmotic adjustment and fruit set. Banerjee and Kalloo (1991) found that number of flowers per cluster was highest in *Lycopersicon pimpinellifolium* than other commercial cultivars of tomato under rainfed conditions.

Brinjal:

Brinjal seeds pelleted with arappu and pungam leaf powders maintained its superiority in germinability than the untreated control even after eight months of storage (Viswanatha Reddy, 1995). In brinjal, application of potassium chloride at one per cent reduced the effect of drought by maintains high leaf number and leaf area leading to higher dry matter production through the better photosynthetic activity. Use of anti-transpirants increases the tolerance to moisture stress situations of brinjal. Prakash (1990) found that the diffusive resistance, relative water content and soluble protein were increased by spraying of cycocel @ 500 ppm in brinjal.

Chilli:

Chilli is one of the most important crops cultivated mainly under black soils of rainfed conditions. The states like Andhra Pradesh, Karnataka are major chilli growing areas under rainfed conditions. The *gundu* types are generally more pungent than *samba* types and they are adapted to rainfed culture than *samba* types. In chillies, the initial germination and subsequent seedling establishment and also the high mortality rate of the seedlings in the nursery are posing a great problem and seed pelleting as a pre-sowing treatment can enhance the seedlings and thus enhanced the yield can be obtained. Jerlin *et al.* (2008) reported that, Chillies cv.K1 has registered highest seed quality characters by using aluminium foil as a storage material and this was followed by 400 gauge polythene bag and cloth bag. Natarajan (1990) found that application of 75 kg nitrogen through soil and foliar sprays recorded the highest dry pod yield in chilli cv. Ramanathapuram Local under semidry conditions.

Bhendi:

In bhendi, polythene mulch has recorded highest yield than control and grass mulch under moisture stress situations (Gupta and Gupta, 1985). Application of exfoliated vermiculite @ 20 t ha^{-1} increases the moisture retention capacity at 0.1 bar tension, decreases the bulk density and saturates the hydraulic conductivity of the soil and increases the yield of bhendi (Gupta and Gupta, 1982).

Cucurbits:

Most of the cucurbits are planted in rainfed situation. In arid regions, cucurbit like xerophytic plants can absorb moisture from the atmosphere. Under lesser moisture

Table1 : List of vegetable varieties suitable for rainfed cultivation

Sr. No.	Crop	Varieties suitable for rainfed cultivation
1.	Tomato	Pusa Early Dwarf, Pusa Ruby, Arka Meghali, Paiyur-1, CO3, PKM 1, J-10-21 and KT-1
2.	Brinjal	PKM1 and APAU Bagmathi
3.	Chillies	K-1, K-2, G-3, G-4,G-5 (Andhra Jyoti), Sindhur (CA-960), CA-1068 (Aparna), Arka Lokit and PMK1
4.	Pumpkin	CM-14
5.	Water melon	Durgapura Meetha and Durgapura Kesar
6.	Dolichos beans	Konkan Bhusan
7.	Faba bean	BR1(black seeded), BR2(yellow seeded), Jawahar Vicia
8.	Cluster bean	Pusa Sadabahar, Pusa Mausami and Pusa Naubahar
9.	Elephant foot yam	Gajendra

conditions seed germination is very difficult process and affects the plant population. In case of musk melon the seeds are soaked in water over night and then kept in moist cloth or gunny bags in a warmer place and germination commences with in 3-4 days. Also, the seed water content declines rapidly 10 days after anthesis and 25 days later, the seed becomes tolerant to rapid desiccation.

Singh *et al*. (1975) found that incorporation of bentonite alone or in combination with farm yard manure significantly increases the yield over other treatments in Cucumber. Pitcher irrigation is recommended for getting higher yield in bitter gourd grown under rainfed cultivation (Reddy and Rao, 1983).

Leguminous vegetables:

Faba bean is grown as *rabi* crop in India under rainfed conditions. Cluster bean (*Cyamopsis tetragonoloba*) popularly known as guar is a drought hardy, deep rooted, summer annual legume, grown as vegetable. This crop is susceptible to water stagnation and as well as severe drought condition and hence the seed germination, emergence and establishment are very difficult under these conditions. In cluster bean cv. PUSJI NAVBHAGAR, seeds coated with polykote @3g kg^{-1} along with bavistin @2g kg^{-1} maintained the seed germination and seedling vigour both initially and after accelerated ageing (Renugadevi *et al*., 2008). Application of 20 kg N, 60 kg P_2O_5 and 10 kg $ZnSO_4$ recorded the highest number of pods per plant (Maliwal *et al*., 1987) in cluster beans.

Agro horticulture:

Drumstick comes up well in all soils and can be grown even in waste lands. It is predominant crop of dry and arid tracts. Most fruit trees grown in dryland take 5-8 years to cover the interspaces. Further, in dry land fruit trees like ber, pruning is done every year, so, the inter-space is available. In such cases, intercrops can be grown successfully and profitably between the fruit plants in a system of agro-horticulture. The crops grown in the interspaces should be normally low stature and of short duration, so that, they do not compete with the fruit trees for light, moisture and nutrients. At Hyderabad, agro-horticulture system involving ber and vegetables resulted in higher returns than ber alone (Somani, 1992).

Conclusion:

Vegetable cultivation under rainfed condition is not much popular while comparing to other systems of cultivation. However, it solves the problem of rural poverty and malnutrition. Therefore, much concentration should be given for rainfed vegetable farming by efficient adoption of techniques *viz*., selection of varieties, seed treatment practices, use of growth regulating substances and crop husbandry practices.

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