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# Physiological disorders in Vegetables and their management

**Amit Verma[1] and Monika[1*]**
[1]Department of Vegetable Science, CCS HAU, Hisar
*Corresponding author's Email: khichimonika97@gmail.com

## Abstract

Physiological or abiotic disorders area the limiting factors modern vegetable crops production. They differ from other disorders in that they are caused by non-living, abiotic circumstances rather than living organisms (viruses, bacteria, fungus, insects, etc.) and cause a divergence from normal growth. They are deviations from typical physical or chemical changes in a plant, usually produced by an external stimulus. The majority of physiological problems are irreversible once they have manifested. Physiological problems play a significant impact in reducing fresh vegetable output and quality. Hence it becomes important to understand their causes and possible ways of their management.

**Keywords:** Causes, Management, Symptoms, Vegetables

## CHILLI AND SWEET PEPPER

- **Blossom end rot**


**Cause:** Blossom end rot in sweet pepper and chilli is caused by excess nitrogen, water stress, and a lack of calcium.

**Symptoms:** A sweet pepper disease in which water-soaked patches emerge first on the blossom end of the fruit. As the lesions dry out, the patches turn pale brown and papery.

**Control:** At the time of fruit development, a single foliar spray of 0.5 percent calcium chloride ($CaCl_2$) was applied. Irrigation and staking should be done.

- **Sunscald**

**Cause:** It is a sweet pepper condition that happens when the fruits are exposed to searing sunshine. Sunscald can be caused by wide plant spacing and bacterial spot defoliation.

***Symptoms:*** It appears as a delicate, light-coloured patch on the fruit that wrinkles somewhat.

***Control:*** Proper fertiliser and irrigation during prolonged periods of hot weather will promote strong foliage growth.

- ***Skin cracking***

***Symptoms:*** Cracking around the shoulder of sweet pepper fruits is a sweet pepper problem. Temperature and humidity variations are linked. Cracking is more likely when the temperature is high during the day and the relative humidity is high.

***Control:*** Water must be available to plants at all times. When the rate of transpiration is high, this will reduce water flow from the fruit to the leaves.

- ***Flower and fruit drop (a major problem in chilli cultivation)***

***Causes:*** Low humidity and high temperatures, diminishing light intensity, short days and high temperatures, and high temperatures during the early phases of blooming

***Control:*** Irrigation during flowering and fruit set. 50 ppm NAA foliar spray during full bloom set stage. Flowers and fruit drops are also significantly reduced when Triacontanol is used.

## ***BRINJAL***

- ***Calyx withering***

Between the middle of February and the middle of April. Fruits turn a reddish-brown colour and lose their shine, reducing their marketability. The calcium and nitrate content of the damaged fruits is significantly higher than that of healthy fruits.

- ***Chilling injury***

***Causes:*** Eggplant fruits are vulnerable to chilling at temperatures below 10°C (50°F). Chilling injury occurs in 6-8 days at 5°C (41°F).

***Symptoms:*** Pitting, surface bronzing, and browning of seeds and pulp tissue are indications of chilling injury. Alternaria spp. causes accelerated deterioration in cold

stressed fruit. Chilling injury develops over time and might begin in the field before to harvest.

## OKRA

- **Warty/ senescent bhindi pods**

**Cause:** Deficiency of nitrogen

**Symptoms:** The appearance of the pods becomes warty and rough, impacting the cooking and nutritional properties.

**Management:** Nitrogen Fertilizers should be applied properly.

## RADISH

- **Pore extent or pithiness**

**Symptoms:** It degrades the quality of the radish and reduces its commercial value. Pores are generated when parenchymatous cells in root tissues collapse due to excessive root growth compared to the leaf tissue's ability to absorb nutrients. Senescence is marked by pore formation, which varies in intensity amongst cultivars.

**Cause:** Harvesting should be done at the appropriate time, as this disease is caused by delayed harvesting.

- **Elongated root or forking**

**Symptoms:** A secondary elongating growth in the root causes an elongated root.

**Cause:** Excessive moisture during root formation is the cause. Due to soil compactness, it occurs on heavy soils. Use of organic manure that has not decomposed.

**Control:** It can be remedied by limiting the amount of moisture in the field, using balanced irrigation, and seeding the radish in sandy loam or light soil with loose and friable soils.

- **Akashin**

It is caused by a boron insufficiency. Temperature variations during the day and night have an impact. This problem can be reduced by applying 15–20 kg/ha borax to the soil and 0.1 % B as a foliar treatment.

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## CAULIFLOWER

- **Buttoning**

**Symptom:** The appearance of tiny curds or buttons. The main theory is that any halt in the seedlings' vegetative growth will cause them to button.

**Causes:** Planting of over-aged seedlings that haven't had enough time to start growing before being transformed into curds. If you choose the wrong cultivars, you'll end up planting the early variety late. Insects or pathogens can cause root damage.

**Control:** This problem can be prevented by applying excessive nitrogen, minimising transplanting shocks, and providing favourable conditions during plant vegetative growth. The seedlings to be transplanted should not be older than six weeks (Wurr *et al*., 1984).

- **Riceyness**

**Symptom:** Riceyness refers to the premature initiation of floral buds or the extension of the peduncle stem of an inflorescence. This condition occurs as a result of temperature variations and a lack of seed stock. For marketing purposes, the curds are deemed to be of inferior quality.

**Cause:** Temperatures that are greater or lower than the optimum for curding in a specific cultivar are the cause. Riceyness is caused by a combination of high nitrogen and high temperature, which promotes rapid growth and development of curd.

**Control:** During the growth of the head or curd, proper soil moisture and fertility management is essential.

- **Blindness**

**Symptoms:** Plants that lack a terminal bud are known as blind plants. By accumulating carbs, the leaves become thick, dark green, big, and leathery, and the plant remains vegetative.

**Cause:** The cause is a lack of soil fertility. Insects, infections, and other factors can cause damage. Inconsistency in the genes. The weather is cool. Damage to the terminal portion of the plant as a result of handling during the planting process.

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***Control:*** Plant healthy, strong seedlings with the terminal section intact.

- ***Fuzzyness***

***Symptoms:*** The curd appears velvety due to the extension of the flower pedicle in this disorder. This is due to inherited factors or unfavourable circumstances (Boersma *et al.*, 2013).

***Cause:*** Temperatures that are greater or lower than the optimum for curding in a specific cultivar are the cause.

***Control:*** Proper soil moisture and fertility control during head or curd growth.

- ***Bracting***

***Symptoms:*** The bracts are located beneath the prefloral meristem, which corresponds to the axillary buds. These bracts or leaves that emerge from the curd resulted in poor curd quality for marketing because they turn green or purple when exposed to direct sunlight at the curd's surface.

***Cause:*** High temperatures following the curdling stage and a delay in harvesting are the causes of this disorder.

***Control:*** Choosing the appropriate variety for the growth season.

- ***Purple colouring/ pinking***

Due to the curds' exposure to strong light intensities, they have a pink tinge. Anthocyanin pigment develops in this situation, giving the curds a pink tint (Hazra and Som, 1999).

- ***Whip tail***

***Cause:*** Deficiency of Molybdenum (Mo) is the cause of this disorder.

***Symptoms:*** Chlorosis of leaf margins and whiteness of entire leaves can be noted in young plants (Swati, 2015). Leaf blades do not grow properly, and only the midrib develops in severe deficit. The lamina of newly developed leaves on older plants is uneven in shape, often consisting of simply a broad exposed midrib, hence the common name "Whip tail."

***Control:*** this can be managed by sodium molybdate @ 10-15 kg/ha (Scheffer *et al.*, 1987)

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- ***Browning (red or brown rot)***

***Cause:*** It is caused by boron deficiency.

***Symptoms:*** The first indicator of appearance is smaller water-soaked spots in the centre of the curd. The stem becomes hollow in later stages, with water-soaked tissues surrounding the cavity's walls. Red or brown rot appears when a pinkish or reddish-brown patch develops on the surface of the curd in later stages.

***Control:*** Application of borax at a rate of 20kg/ha as a control. Four sprayings of 0.25 to 0.50 percent borax solution @ 1-2 kg/ha with 0.1 percent Teepol as a sticker provide acceptable control in acute deficiency. Spraying with 0.2 to 0.25 percent boric acid or sodium borate works just as well (Hazra and Som, 1999).

- ***Blackspeck***

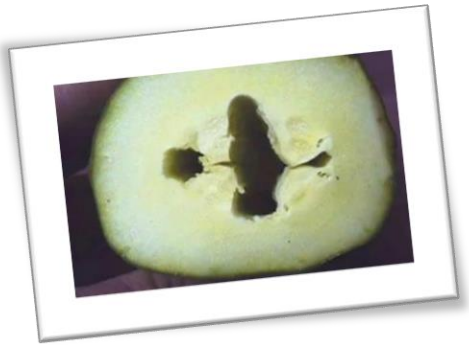
***Symptoms and cause:*** The popular snowball cultivar of cauliflower suffers from this physiological disorder. It occurs when snowball (late) cultivars are exposed to warm weather during the early stages of curd development (Hazra and Som, 1999).

***Control:*** A foliar spray of calcium nitrate or a reduction in nitrogen fertiliser may be used to control the problem.

***CUCURBITS***

- ***Pillow***

***Symptoms and cause:*** It's a cucumber processing abnormality caused by a lack of calcium in the tissue. The mesocarp of the fleshy harvested fruits develops an unusual white styofoam-like porous rough tissue in this condition. Some pillow sections may have vascular tissue that collapses and becomes necrotic.



***Control:*** Make sure you have enough calcium.

- ***Leaf silvering***

***Symptoms and cause:*** It is a physiological condition that affects summer squash (*Cucurbita*

*pepo*). This condition is caused by a lack of moisture. The leaves turn silvery in colour and have less chlorophyll. In the silvered leaves, photosynthesis is impeded.

***Control:*** Irrigate thoroughly and frequently.

- ***Unfruitfulness in pointed gourd***

***Symptoms and cause:*** Pointed gourd are a dioecious cucurbit. As a result, male and female plants are separate. Female plants' pistillate flowers are shed due to a lack of pollination and fertilization, which is a typical problem. Due to parthenocarpy stimulation, the ovary of the unfertilized flower may flow a little and then abscise after a few days.

***Control:*** To guarantee optimal pollination and fruit set, male plants must be cultivated in the field alongside female plants at a rate of 10-12 male plants per 100 female plants. Hand pollination is a viable option for achieving fruit set. Because stigma sensitivity decreases as the day progresses, hand pollination of female flowers should be done early in the morning.

- ***Blossom-end root***

***Symptoms:*** The fruit's blossom end takes on a dark leathery appearance. Symptoms may worsen until the fruit's entire end turns black and rots.

***Cause:*** Insufficient calcium uptake and alternating wet and dry soil seasons are linked to this disorder. Reduced calcium uptake and the development of blossom-end rot could be caused by root system damage.

***Control:*** Mulching to ensure regular soil moisture, adding calcium fertilisers, and avoiding high nitrogen levels are all ways to keep it under control. To manage water, drip irrigation the crop.

- ***Hollow heart***

***Symptoms:*** Internal watermelon fruit flesh cracking can develop as a result of increased expansion in response to excellent growing conditions.

***Cause:*** Although this illness has a genetic component, growing conditions can account for much of the diversity reported. It appears to be linked to situations that result in inadequate pollination followed by rapid fruit development.

***Control:*** Stay away from watermelon kinds that have a hollow heart. Implement irrigation and

fertilization systems that follow best practices (Mal *et al*., 2019).

- ***Light belly color***

***Symptoms:*** The underside of cucumber fruit remains light in colour rather than turning dark green, indicating this illness.

***Cause:*** This disease is most commonly found on fruit that has been left in chilly, damp soil.

***Control:*** Partially controlled by avoiding the growth of luxuriant vines. Excess nitrogen should be avoided.

- ***Rind necrosis***

***Symptoms:*** Dead, hard, dry reddish-brown to brown areas or patches of tissue appear in the rind of either cantaloupe or watermelon. The affected areas range in size from little spots to large dead areas that cover the entire rind. Symptoms in watermelon are not obvious from the outside and are only found in the flesh on rare occasions. Dead tissue in cantaloupe can extend into the flesh of the fruit. On the cantaloupe fruit's surface, circular, water-soaked depressions appear.

***Cause:*** Not properly recognized. Environmental factors that stress plants, on the other hand, are suggested to be a trigger for the start of this disorder.

***Control:*** Watermelon has been found to have genetic tolerance. Melon should not be subjected to drought stress.

- ***Sunscald***

***Symptoms:*** Fruit develops papery white patches.

***Cause:*** When fruit is suddenly exposed to direct sunlight during hot summer conditions, this condition develops.

***Control:*** Minimize by ensuring that the fruit is covered by robust vine growth.

- ***Delay in fruit ripening***

***Symptoms and cause:*** This is an especially serious issue in muskmelon and watermelon. Due to high moisture levels and temperature fluctuations throughout the ripening cycle, ripening is sometimes associated with decreased flavour and fruit shattering.

***Control:*** To hasten ripening, irrigation should be turned off at the ripening stage. Sowing timing should be regulated such that fruits ripen in hot, dry conditions, hastening ripening and improving fruit flavour.

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## SWEET POTATO

- **Water blisters (edema)**

**Symptoms:** Small masses on the exterior of the roots (enlarged lenticels).

**Causes:** Roots are exposed to excessively damp soils for an extended period of time, resulting in a lack of oxygen.

**Management:** Sweet potato should be planted in well-drained soil. In marshes, make sure the ridges or mounds are high.

- **Sun scalding**

**Symptoms:** Scalded areas are purplish-brown in colour and prone to secondary infections.

**Causes:** Roots exposed to direct sunlight at high temperatures.

**Management:** Sweet potato roots should be earthed up well and placed in the shade as soon as possible after harvest.

## Conclusion:

Vegetables are an important part of a balanced diet. However, these commodities are frequently affected by a variety of disorders that reduce the overall quality of the fruits and result in significant losses. All fruit changes and quality flaws that aren't caused by infections are classified as physiological diseases. These non-infectious illnesses can be difficult to spot at times. Furthermore, once symptoms are identified, corrective methods are frequently not cost-effective. As a result, concentrate on prevention. To reduce the risk of abiotic disorders during pre-harvest and post-harvest operations, a number of measures can be adopted. These include seeding at the right time, maintaining uniform soil moisture, providing balanced nutrients, harvesting at the right stage, and appropriate post-harvest processing and storage (Kathayat and Rawat, 2020).

## References:

Boersma M, Gracie, AJ, Brown, PH (2013) Evidence of mechanical tissue strain in the development of hollow stem in broccoli. Scientia horticulturae, 164, 353-358.

Hazra P, Som MG (1999) Technology for vegetable production and improvement, Naya Prakash, 185-188.

Kathayat K, Rawat M (2020) Physiological disorders in vegetable crops. *In:* Advances in Horticultural Crop Management and Value Addition.

Mal D, Yeshwanth M, De S, Roy S, Shome S, Sen A (2019) A review on physiological disorders in cauliflower: Causes and Management Approach. Think India Journal, 22(34): 496-505.

Scheffer JJC, Wilson GJ (1987) Cauliflower: molybdenum application using pelleted seed and foliar sprays. New Zealand Journal of Experimental Agriculture, 15(4), 485-490.

Wurr DCE, Fellows JR (1984) Cauliflower buttoning—the role of transplant size. Journal of horticultural science, 59(3), 419-429.