

Original Research Article

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Influence of Mulching Material on Albinism Disorder in Strawberry under Cold Arid Conditions

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ABSTRACT

Albinism is a serious disorder of strawberry in which fruits appear bloated, develop poor color flavor and become susceptible to fruit rot during storage. Many factors have been reported to be associated with albinism, but vigorous vegetative growth of the plant is considered as the primary factor. Strawberry is one of the most delicate fruit, which is grown commercially in temperate climatic conditions of the world. For its successful cultivation, mulching is considered as most useful cultural practice. Mulching helps in better conservation and utilization of hydrothermal regimes, which helps in better growth and yield. Three mulch materials (Black polyethylene, White polyethylene, and Paddy Straw) were evaluated to reduce albinism in five cultivars of strawberry. Fruits suffering from albinism appear bloated, develop poor colour, are liable to serve damage during harvesting and become highly susceptible to fruit rot during storage. The incidence of albinism was highest (38.60%) with black polyethylene and lowest with paddy straw (22.65%). Among cultivars, Erna had the highest incidence of albinism (50.60%) followed by chandler (41.60%), where as Sweet Charlie had the least.

Keywords

Mulching,
Strawberry,
Albinism

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Introduction

Strawberry is one of the most delicious and refreshing fruit in world, which is cherished in gardens for its beautiful, attractive fruit that has a tantalizing aroma. Though it is a major fruit of temperate climates, it also grows profitably well in subtropical plains of India (Sharma *et al.*, 1999). It suffers from many disorders, but albinism is considered as most serious disorder of its fruits, occurring primarily at the time of ripening. It is particularly serious in greenhouse grown

strawberries, which has reached an alarming situation in USA, Belgium and the Netherlands (Lieten *et al.*, 1993), though (Sharma *et al.*, 2002) has also observed its incidence in field grown strawberries under sub-tropical climates. Fruits suffering from albinism appear bloated and develop white or pink areas on its surface and its pulp remains pale. It has a poor flavour and tends to be more acidic than a normal fruit. Similarly, the affected fruit does not ripe uniformly, is liable

to be severely damaged during harvesting and is highly susceptible to fruit rot during storage (Lieten *et al.*, 1993, Sharma *et al.*, 2002). The marketing of such a fruit is very difficult, and, if marketed, it fetches a very poor price, giving to farmers fewer returns for their investment (Sharma *et al.*, 1999, Sharma *et al.*, 2002).

Strawberry is one of the most delicate fruit, which is grown commercially in temperate climatic conditions of the world. However, with the development of day-neutral varieties, it grows profitably well in tropical and subtropical climatic condition of India (Sharma, 2002). For its successful cultivation, mulching is considered as most useful cultural practice. Mulching helps in better conservation and utilization of hydrothermal regimes, which helps in better growth and yield. For mulching, different materials are used but black polyethylene is used commercially all over the world (Tarara, 2000). Under tropical and subtropical climates, strawberry suffers from many disorders, but albinism is considered as most of the serious disorder of strawberry fruit, occurring primarily at the time of fruit maturity or ripening.

Fruits suffering from albinism appear bloated, develop poor colour, are liable to serve damage during harvesting, become highly susceptible to fruit rot during storage (Lieten and Marcelle, 1993) and fetch very poor price in the market. Many reasons could be attributed to albinism, but excessive growth of the runners occurring due to heavy nitrogen fertilization is mainly associated with it and mulching materials may influence it invariably (Badiyala and Aggarwal, 1981; Himelrick *et al.*, 1983; Lieten and Marcelle, 1993; Sharma and Sharma, 2004). Though it is a serious disorder in greenhouse grown strawberry but in the recent years, its incidence has been observed in field grown

strawberry as well (Sharma and Sharma, 2003). In cold arid regions of India strawberry is mostly grown under poly house conditions and hence, the systematic studies were conducted to observe the effect of different mulch materials on albinism incidence in strawberry.

Materials and Methods

The studies were conducted in the research field of High Mountain Arid Agriculture Research Institute (formerly Regional Agriculture Research Station) SKUAST-K Leh in the year 2011-12. Two hundred runners each of the five varieties *viz.* Sweet Charlie, Douglas, Chandler, Fern and Etna, were planted on the raised beds at a distance of 30 x 45 cm during the last week of October each year. Black polyethylene (BP), White polyethylene (WP) and Paddy Straw (PS) were applied as mulch materials to the runners after 15 days of planting, while no mulch was applied to the control plants. Each treatment consisted of three beds, replicated three times. Observations on albinism incidence (%) was recorded by counting healthy and albino fruits in five randomly selected plants/bed and expressed as percentage (%). The data of two years was pooled and subjected to analysis following RBD factorial design (Panse and Sukhatme, 1984).

Results and Discussion

Nearly 33 per cent strawberry fruits were affected by albinism under field grown conditions. Such report has been presented by Sharma and Sharma (2003), which was the first report in the world on the occurrence of albinism in field grown strawberries. In the present studies, albinism incidence was the highest when plants were mulched with black polyethylene (38.68%) and least (22.65%) in the plants mulched with Paddy Straw (Table

1). In case of control, plants produced as high as 36.81 per cent albino fruits. The incidence of albinism was influenced by mulching, being significantly high with black polyethylene and very less in case of Paddy straw, which may probably due to better growth of plants under black polyethylene mulch compared to other mulch materials and control (Lieten and Marcelle, 1993). In addition, black polyethylene mulch is also

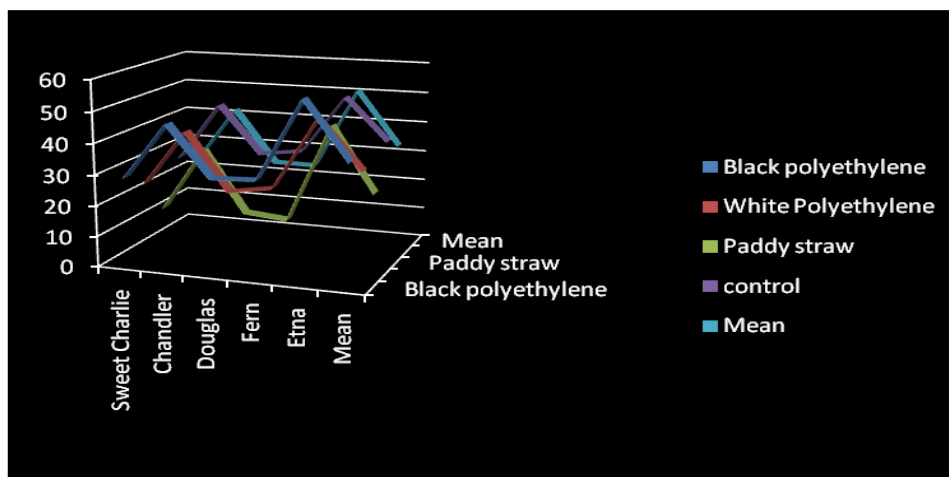
known to promote nitrogen mineralization, which might have also favoured the incidence of albinism (Renquest *et al.*, 1977; Tarara, 2000). Albinism incidence was observed to be lesser in plants mulched with paddy straw (22.65%) signifying its importance over other mulch materials under subtropical climate. Among different cultivars, the incidence of albinism was highest in Etna (50.60%) and least in Sweet Charlie (22.50%).

Table.1 Effect of different mulch materials on albinism incidence in strawberry

Cultivars	Albinism incidence (%)				Mean
	Mulching materials				
	Black polyethylene	White Polyethylene	Paddy straw	control	
Sweet Charlie	28.40	23.30	11.75	26.50	22.50
Chandler	46.56	41.60	32.75	45.60	41.60
Douglas	30.34	22.98	12.65	29.75	23.93
Fern	30.92	25.22	11.35	31.60	23.70
Etna	56.76	48.39	43.75	50.60	50.60
Mean	38.62	32.90	22.65	36.81	32.71

CD at 5% Mulch = 1.98, Cultivar = 1.95, Mulch x Cultivar = 2.66

Fig.1 Effect of different mulch materials on albinism incidence in strawberry



The wider availability in respect to albinism among different cultivars may be genetic variability related to vigourness of plants. In general, cultivars having vigorous growth (e.g., Etna) produce albino fruits in higher proportion and vice versa (Sharma and Singh, 1999; Sharma and Sharma, 2004) (Fig. 1).

The interaction, mulch x cultivar for the albinism incidence was significant with the highest production of albino fruits in Etna (56.76%) under black polyethylene mulch and lowest in Sweet Charlie (11.75%) under paddy straw mulch. It may be due to synergistic influence of genetic variability and black polyethylene on albinism incidence.

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