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# Study the Effect of Mulch on Yield of some Strawberry Cultivars in Ardabil Condition

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***Abstract:*** *Mulch is a soil surface cover which produces favorite microclimate for plants' growth and yield. In order to determine suitable mulch types and Strawberry cultivar fitted to Ardabil climate a split plot experiment based on randomized complete block design with three replications was conducted in experimental field of Mohaghegh Ardabili University during 20013-2014. In this study, four mulching methods, including Straw (5 cm), black plastic, light plastic and without mulch (control) were placed in main plots, and various cultivars, including Pazhero, Paros and Queeneliza were placed in subplots, respectively. Analysis of variance showed that the effect of cultivar and mulching methods were significant for more of traits. The interaction between mulch type and strawberry cultivar were significant. With respect to traits such as final yield, soil moisture, fruit quality and weed control, black plastic mulch was best cover for Ardabil condition. Also among studied cultivars, Paros had the highest fruit quality and compatibility in this situation. According to these results, Paros cultivar with black plastic mulch cultivation is recommended for Ardabil climate condition.*

***Keywords:*** *Plastic , Paros, Pazhero, Queeneliza, Straw*

## 1. Introduction

Distribution of strawberry (*Fragaria ananassa*) has been reported in most areas of the Northern Hemisphere (Hancock (999). Mulches, cover the soil surface that provides a microclimate favorable for plants, Impact on plant growth and yield added to the soil surface for reduce evaporation, more water infiltration, soil erosion control, weed control, improving soil structure and etc (Gunadi 1988, RoyA 1990). Mulch is produced from organic or synthetic materials (Abdul-baki 1996) Soil temperature is important of the different aspects as seed germination and plant growth (Jalil 2004). Soil temperature can be adjusted with the use of mulches. This materials also reduced the effect of soil destroys and cold. Mulches reduce soil evaporation and increase yield through increasing water use efficiency (Adekalu 2006).The method of increasing water use efficiency by synthetic mulch and organic mulch is different. The main factor preventing the evaporation by organic mulches is soil temperature (Bushnell 1931). The main factor preventing the evaporation by plastic mulch is the impervious them (Farias-Larios 1994).

Weeds are one of the factors causing damage to agricultural crops. The amount of damages to agricultural production by weeds is determined as 45%. Mulch increase yield by increasing photosynthesis and photosynthetic reserves (Briassoulis 2006). Mulches have effect on the fruit quality in terms of color, shape, size, sugars and organic acids (Rubeiz 1991).

The aim of this study has estimating of the effect of mulch on yield, quality and selection of Strawberry suitable varieties to Ardabil weather conditions.

## 2. Materials and methods

This study was conducted in 2013- 2014 at the University of Mohaghghegh Ardabili. Ardabil is located in longitude 48°. 77′ and38°, 15 latitude ′. Its height from sea level is 1350 m.

Studied in a split-plot experiment based on randomized complete block design with 3 replications. Four planting bed (without mulch, 5 cm wheat straw, white plastic and black plastic as mulch) as main factors and three varieties of strawberries (parus, Kevin Lisa and Pazharv) as second factor were. Plots with 4 × 1.5 m dimension and rows with 75 cm space between them considered three cultivars of strawberry transplants were planted with distance of 25 cm on rows. The number of fruits per plant, average fruit weight, yield mean plots, the number of weeds grown in square meters and the depth of soil moisture ten days after irrigation were measured.

Analysis of variance and comparison was by using MSTATC software.

## 3. Results and Discussion

Analysis of variance revealed significant deference between done mulches in all studied traits. The cultivar and interaction between the mulch and cultivar and significant deference in the most characteristics (Table 1). The results of this study showed that the black plastic cover on the number of fruits per plant, yield plots with other treatments was statistically different (Table 1). The effect of mulch on yield and its components have been reported in various studies. The effect of mulch on plant yield through changes in weather conditions that can change the soil temperature and this influence on the growth and yield. The effect of mulch can be done through weed control, make favorable conditions of temperature and soil moisture, reduce leaching of nutrients and soil fertility, increase the efficiency of water use, increase availability of Absorption of nutrients, increased root growth and control of diseases and pests. Strawberries growing influence of black polyethylene mulch is more than plants affected light polyethylene mulch (Singh 2005). In the cucumber yield rate in black mulch was more than covers of red and blue. The yield of the transparent cover was better than of straw and control (Farias-Larios 1994). Using organic mulch yield losses due to the reduction in temperature in the coldest areas of optimal soil and reduce soil nitrate content during the early use of mulch (Awal 200, Bushnell 1993). The results corresponded to the studies mentioned. The highest number of fruits per plant and the highest yield per plot belong to black mulch and minimum amount of product in the above mentioned traits belong to the straw mulch. In weight of fruit, black plastic cover was significantly different from control and straw mulch but did not differ with clear coating (Table 2).

TABLE I: Results of analysis of variance for the traits

| | | **Mean square** | | | | |
|---|---|---|---|---|---|---|
| Resource change | Degree of freedom | Number of fruits per plant | Fruit weight | Plots yield | Number of weed plots | Deep moisture |
| Repeat | 2 | $1.37^{ns}$ | $.013^{ns}$ | $8456.9^{*}$ | $1.6^{ns}$ | $.05^{ns}$ |
| Mulch | 3 | $119^{**}$ | $6.23^{*}$ | $197937^{**}$ | $20136.1^{**}$ | $114.3^{**}$ |
| Error | 6 | .47 | .07 | 1605 | .99 | .16 |
| cultivar | 2 | $10.37^{*}$ | $3.13^{**}$ | $13686^{ns}$ | $24.3^{**}$ | $.51^{ns}$ |
| Mulch× cultivar | 6 | $63.89^{**}$ | $1.52^{**}$ | $10371^{**}$ | $1.1^{ns}$ | $.51^{ns}$ |
| Error | 16 | 2.4 | .018 | 8666 | 1.8 | .37 |
| **CV(%)** | **-** | **16.53** | **3.04** | **29.62** | **2.24** | **15.55** |

**, *، ns . Indicating non-significant, significant and at 5% and 1% respectively

Mulch effect on fruit quality is done through effects on the metabolism of carbohydrates (Hancock 1999, Hassan Khan 2005). Black polyethylene mulch increased the size of the fruit, of strawberry (Arancon 2012, Singh 2006). Cucumber fruits of black polyethylene mulch largest and the smallest fruit in the soil is uncovered (Farias-Larios 1994). The results are consistent with the achievements of other researchers. Organic mulches against the plastic mulches the soil temperature 6-4 ° C reduce (Bushnell 1993). The results also indicate the fact that Varieties grown in plastic covers have better results to control and straw in climate of Ardabil.

In number of weeds in the plots, significant difference was observed between all covers. The best result In this character related to black plastic cover, The highest number of weeds was observed In control treatment (Tables 1, 2). These results correspond to other studies. Organic mulches are not effective in controlling weeds as plastic mulch (Bushnell 1993). Black polyethylene mulch most effective in controlling weeds and clear polyethylene mulch has an adverse effect on weed control (Jalota 1979, Johnson 2005).

In terms of mulch retains soil moisture between treatments were significant differences (Tables 1, 2). Black plastic mulch is better than the other retains moisture coatings. This result is consistent with other studies. Droplets evaporate from the soil surface, cooled by a collision with mulch, drip back on the bed and keep the moisture out of the soil (Abbott 1992, Hassan Khan 2005, Kar G and Kumar 2007. Singh 2005). In this study, the best results came from the interaction of dark plastic mulch and cultivars parus.

TABLE II: Comparison of the means using Duncan's method

| | treatments | Number of fruits per plant | Fruit weight(g) | Plots yield(g) | Number of weed plots | Deep moisture(Cm) |
|---|---|---|---|---|---|---|
| Mulch | without mulch | $8.46^{c}$ | $3.62^{b}$ | $239.53^{b}$ | $111.8^{a}$ | $7.97^{a}$ |
| | straw | $4.41^{d}$ | $3.9^{b}$ | $145.05^{c}$ | $40^{c}$ | $5.72^{b}$ |
| | clear mulch | $11.3^{b}$ | $5.2^{a}$ | $406.08^{a}$ | $82^{b}$ | $1.89^{c}$ |
| | black mulch mulch | $12.62^{a}$ | $5.21^{a}$ | $467^{a}$ | $3.89^{d}$ | $.13^{d}$ |
| cultivar | Pazharv | $8.82^{b}$ | $4.38^{b}$ | $316.07^{a}$ | $57.92^{b}$ | $3.69^{a}$ |
| | parus | $8.51^{b}$ | $5.03^{a}$ | $347.33^{a}$ | $59.58^{a}$ | $4.03^{a}$ |
| | Kevin Lisa | $10.25^{a}$ | $4.02^{c}$ | $279.85^{a}$ | $60.75^{a}$ | $4.7^{a}$ |

Different letters in each column represents a significant means by Duncan's test is at 1%

## 4. Conclusion

The results of this study showed that in climatic conditions of Ardebil, the best mulch, is black plastic and Parus cultivars is the best varieties adapted to these conditions. Accordingly, it is recommended that in climate of Ardebil, to develop strawberries use of black plastic mulch and cultivars parus.

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