

Short Communication

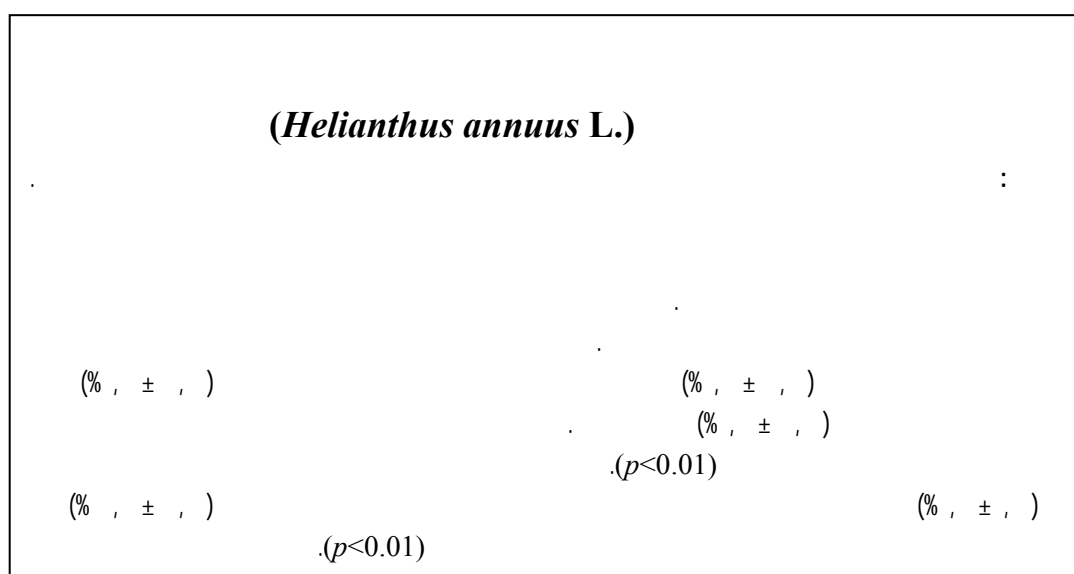
Efficacy of Colour Tapes to Reduce Bird Damage Rate to Sunflowers *Helianthus annuus* L.

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Sclerotina is known as key disease of sunflowers and birds are a key pest of sunflower farms in most areas of Europe and Asia (Bochkarev 1985, Cors & Cartryse 1993), the seeds being very attractive food to birds. Sunflower oil is an important food product both in Iran and the world, but only about 10% of such oil needed by Iran comes from oilseed crops in the country. It is therefore a very important strategy to reduce bird damage to sunflower and other oilseed crops in Iran. Using sunflower varieties and hybrids that are less attractive to birds can reduce the level of bird damage (Cors & Cartryse 1993), as can the deployment of using mechanical devices (Besser 1978). The effects of different ripening times have been evaluated by many researchers (Camprag *et al.* 1974, Cummings *et al.* 1989, Mahli 2000, Samanci 1995), but so far the

application of physical devices has not been investigated in Iran.

To determine the effects of coloured tapes might have in reducing the bird damage rate to sunflowers, nine plots each 25×15 m in size were selected on agricultural farms in the Gorgan area, Golestan province. Application of gold- and silver-coloured silver tapes was compared with the control plots, the work being replicated in three places. Bird damage rating was calculated on 20 sunflower heads on 5, 11, 19, 25 August and 5 September at each plot. The variations on different dates of the different applications were analysed by ANOVA test in the SPSS package.

The average bird damage rate in the applications of gold-coloured tape was the lowest (2.84±10.17%), the average for silver-coloured tape being 4.51±13.61% (Table 1). The lowest damage rate was on 5 August

(0.85±5.70%), and the highest on 5 September (16.44±21.47%) (Table 2). Bird damage rate in the two types of application differed significantly from that experienced by the control plots (9.15±19.25%) ($p<0.01$, Table 3). Bird damage rate on 5 August and 5 September differed significantly from the rate measured on other dates ($p<0.01$, Table 4).

Gold-coloured tapes were more effective than silver-coloured tapes and they were more effective in early September when bird damage rate was high.

Table 1. Average bird damage rates of different treatments.

Treatment	Mean	N	Std. Deviation
Silver tape	4.51	300	13.61
Golden tape	2.84	300	10.17
Control	9.15	300	19.25
Total	5.50	900	15.05

Table 2. Average bird damage rates of different dates.

Date	Mean	N	Std. Deviation
5 August	0.85	180	5.70
11 August	2.29	180	11.09
19 August	3.35	180	15.04
25 August	4.57	180	11.69
5 September	16.45	180	21.48
Total	5.50	900	15.05

Table 3. Results of ANOVA analysis of treatment effects on bird damage rate.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6415.84	2	3207.92	14.59	0.000
Within Groups	197240.15	897	219.89		
Total	203655.99	899			

Table 4. Results of ANOVA analysis of date effects on bird damage rate.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	28296.47	4	7074.12	36.105	0.000
Within Groups	175359.51	895	195.93		
Total	203655.99	899			

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