Abstract

In order to investigate the effects of cover crop species and their mulch management on yield, yield components and weed community in common bean (*Phaseolus vulgaris L.*), a field experiment was carried out as a factorial experiment based on randomized complete block design with three replications in 2012-2013 growing season at the research farm of the Faculity of Agriculture, Ferdowsi University of Mashhad. Treatments were including type of cover crops in three levels of berseem clover (*Trifolium alexandrinum* L.), rye (*Secale cereale* L.) and itercroping of berseem clover+ rye (50:50), in two levels of seeding rate (recommended density and adidtive density), and three levels of mulch managements including herbicide+ mulch (killed cover crops by glyphosate and left the dead mulches on the soil), harvest+ mulch (cut the live cover crops and left them on the soil) and harvest (cut the cover crops and carried them out of the field). For comparision, three control treatments (including no-hand weeding, whole season hand-weeding and weed control by trifluralin preplant herbicide (chemical control) arranged aside the experiment. According to the results, the simple and corresponding effects of experimental traits on density and dry matter of weeds are different at 1 percent. It was found that the density corresponding effect and cover crop on dry matter of broad leaf and narrow leaf weed and densifying traits corresponding effect along with the mulch management on dry matter of narrow leaf weed are only different at 5 percent. Based on the observed simple effects, the ascending density, the mixture of berseem clover+ rye, and herbicide+ mulch management decreased the density of weed by 88.06%, 92.14%, and 97.38%, respectively; than pilot weeding. The corresponding results showed that the ascending densifying trait for mixture of berseem colver+ rye in herbicide management reduces the density and total dry matter by 98.54% and 99.64%, respectively, than pilot weeding. The maximum leaf area index in the ascending densifying trait of cover crop, mixture of berseem colver+ rye, and herbicide management estimated as 2.58, 2.88, and 3.54, respectively. The maximum dry accumulative material in each of these traits are 436/73 490.94, and 597.06, respectively. Simple effects of various traits of cover crop and the mulch management method on the majority of bean characteristics including the number of pod in plant, the number of seeds in pod, grain yield, and biological yield are different at 1 percent. The mixture of berseem clover+ rye achived 7.4, 4.4, 1437.83 and 3743 for each of the measured characteristics, respectively. Additionally, the herbicide+ mulch management these characteristics were 9.8, 4.8, 1965.51, and 4726.7, respectively. It was also observed that the grain and biological yield are affected by cover crop densifying trait. Generally, the results of this study showed that the application of cover crop in bean cultivation could provide a good management method in sustainable agriculture which eventually leads into the increase in inputs efficiency and bringing us closer to a sustainable agriculture goals.

Keywords: mulch, physiological index, sustainable agriculture, weeds management,