

()

(*Sinapis arvensis*)
(*Rapistrum rugosum*)

(*Avena ludoviciana*)
(*Hordeum spontaneum*)

*

(/ / : // :)

(*Avena ludoviciana*)
(*Rapistrum rugosum*) (*Hordeum spontaneum*) (*Sinapis arvensis*)
(*Hordeum vulgare*)

(Hulm, 1998a; Pullaro et al., 2006)

(Andersen, 1989; Hulme, 1998a)

(Davis et al., 2004; Jordan et al., 1995)

(Hartzler

.et al., 2006)

(Brust, 1994;

Westerman et al. (2003a) .Kromp, 1999)

(Cardina et al., 1996; Menelled et al.,

2000)

(Tooley, et al., 1999)

(Holmes & Froud-Williams, 2005)

(Mauchline et al., 2005)

% %

(Westerman et al., 2003a)

(Westerman et al., 2003b)

(Davis & Westerman et al., 2003b)

Liebman, 2003; Heggenstaller et al., 2006; Jacob et al., 2006)

(Hulme, 1998b; Povey et al., 1993; Pullaro et al., 2006)

(Hensen, 2002; Gallandt et Munoz& Cavieres, 2006)

al., 2005; Jacob, et al., 2006; Tooley, et al., 1999)

(Hammond, 1995; Marino et al.,

2005; Willson & Whelan, 1990)

(2005) Marino et al.

(Gorb & Gorb, 2000; Hughes

& Westoby, 1990)

()

()

()

(

(Westerman et al., 2003b)

*

(Marino et al., 2005)

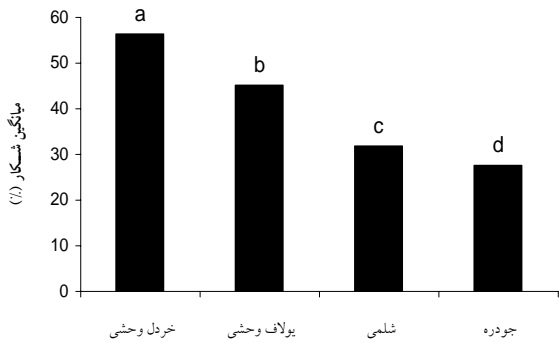
-
4. *Avena fatua*
 5. *Cirsium arvense*
 6. *Sinapis arvensis*
 7. *Polygonum aviculare*

-
1. *Chenopodium album*
 2. *Stellaria media*
 3. *Chenopodium album*

...
 :
 .() (P= /)

F			
/	***	/	
/	***	/	
/	***	/	
/	***	/	
/	***	/	×
/	***	/	×
/	***	/	×
/	***	/	×
P= / :***			

W



P= / LSD

Arcsin \sqrt{X}

SAS

P= / LSD

/	***	/	***	/	***	/	***
/	***	/	***	/	***	/	***
/	***	/	***	/	***	/	***
/	***	/	***	/	***	/	***
- × P= / :***							

.()

% / % / % /)

% /

% /

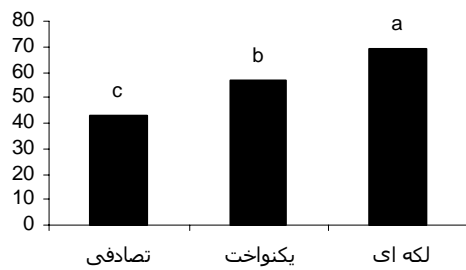
% /

.()

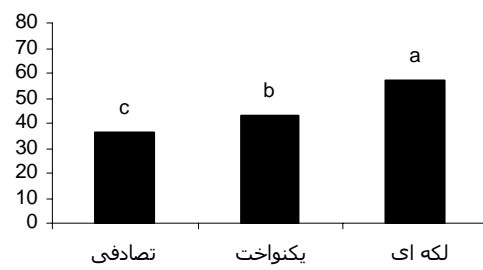
()
 () () / % / % / % / %
 () () ()
 () () P= /
 ()
 /
 /
 ()
 % /
 () % / ()

میانگین شکار (%)

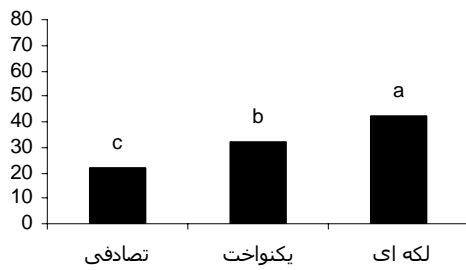
خردل وحشی



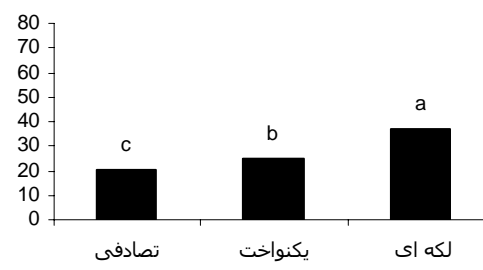
یولاف وحشی



شلمی



جو دره

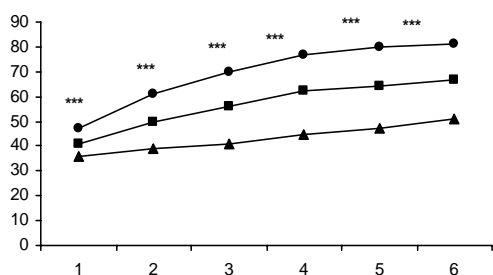


P= / LSD

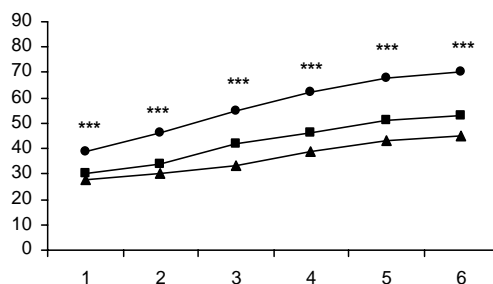
...

:

خردل وحشی

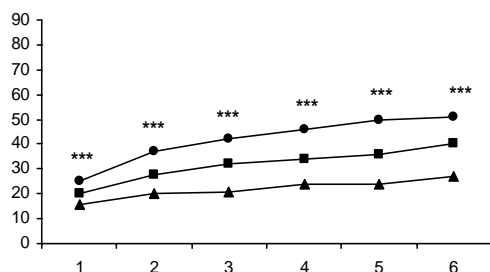


یولاف وحشی

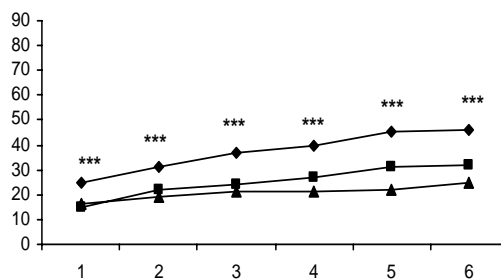


میانگین شکار (%)

شلیمی



جودره



زمان

*** (:▲ :■ :●)

P= /

()

(Hartzler et al., 2006)

(Ghersa & Martinez-Ghersa, 2000; Hartzler, et al., 2006; Menalled et al., 2007; (2006) Jacob et al. Pullaro et al., 2006)

/ e	/ d	/ e	/ e
/ d	/ c	/ d	/ d
/ c	/ b	/ c	/ c
/ b	/ b	/ b	/ b
/ b	/ a	/ a	/ ab
/ a	/ a	/ a	/ a

LSD

P= /

()

/ b	/ b	/ b	/ c
/ b	/ b	/ b	/ b
/ a	/ a	/ a	/ a

P= / LSD

1. *Lolium rigidum*
2. *Raphanus raphanistrum*

(Forcella et al., 1992)

(Gorb &

Hammond .Gorb, 2000; Hughes & Westoby, 1990)

(1995)

.(Jacob et al., 2006)

.()

.()

(2005) Marino et al.

.(Willott et al., 2000)

(% / % /)

.(Munoz & Cavieres, 2006)

()

REFERENCES

1. Andersen, A. N. (1989). How important is seed predation to recruitment in stable populations of long-lived perennials? *Oecologia*, 81, 310–315.
2. Brust, G. E. (1994). Seed-predators reduce broadleaf weed growth and competitive ability. *Agriculture, Ecosystems and Environment*, 48, 27–34.
3. Cardina, J., Norquay, H. M., Stinner, B. R. & McCartney, D. A. (1996). Postdispersal predation of velvetleaf (*Abutilon theophrasti*) seeds. *Weed Science*, 44, 534–539.
4. Davis, A. S. & Liebman, M. (2003). Cropping system effects on giant foxtail (*Setaria faberi*) demography. I. Green manure and tillage timing. *Weed Science*, 51, 919–929.

- ...
5. Davis, A. S., Dixon, P. M. & Liebman, M. (2004). Using matrix models to determine cropping system effects on annual weed demography. *Ecological Applications*, 14, 655–668.
6. Forcella, R. R., Wilson, G., Renner, K., Dekker, A., Harvey, J., Alm, R. G., Buhler, D. A. & Cardina, D. D. (1992). Weed seed banks of the US cornbelt: magnitude, variation, emergence, and application. *Weed Science*, 40, 636–644.
7. Gallandt, E. R., Molloy, T., Lynch, R. P. & Drummond, F. A. (2005). Effect of cover-cropping systems on invertebrate seed predation. *Weed Science*, 53, 69–76.
8. Ghera, C. M. & Martínez-Ghera, M. A. (2000). Ecological correlates of weed seed size and persistence in the soil under different tilling systems: implications for weed management. *Field Crops Research*, 67, 141–148.
9. Gorb, E. V. & Gorb, S. N. (2000). Effects of seed aggregation on the removal rates of elaiosome-bearing *Chelidonium majus* and *Viola adourata* seeds carried by *Formica polyctena* ants. *Ecological Research*, 15, 187–192.
10. Hammond D. S. (1995). Post-dispersal seed and seedling mortality of tropical dry forest trees after shifting agriculture. *Journal of Tropical Ecology*, 11, 295–313.
11. Hartzler, B., Liebman, M. & Westerman, P. (2006). Weed seed predation in agricultural fields. www.weeds.iastate.edu/mgmt/2006/seedpredation.pdf.
12. Heggenstaller, A. H., Menalled, F. D., Liebman, M. & Westerman, P. (2006). Seasonal patterns in post-dispersal seed predation of *Abutilon theophrasti* and *Setaria faberi* in three cropping systems. *Journal of Applied Ecology*, 43, 999–1010.
13. Hensen, I. (2002). Seed predation by ants in south-eastern Spain (Desierto de Tabernas, Almería). *Anales de Biología*, 24, 89–96.
14. Hughes, L. & Westoby, M. (1990). Removal rates of seeds adapted for dispersal by ants. *Ecology*, 71, 138–148.
15. Holmes, R. & Froud-Williams, R. J. (2005). Post-dispersal weed seed predation by avian and non-avian predators. *Agriculture, Ecosystems and Environment*, 105, 23–27.
16. Hulme, P. E. (1998a). Post-dispersal seed predation: Consequences for plant demography and evolution. *Perspectives in Plant Ecology, Evolution and Systematics*, 1, 32–46.
17. Hulme, P. E. (1998b). Post-dispersal predation and seed bank persistence. *Seed Science Research*, 8, 513–519.
18. Jacob, S. H., Minkey, D. M., Gallagher, R. S. & Borger, C. P. (2006). Variation in postdispersal weed seed predation in a crop field. *Weed Science*, 54, 148–155.
19. Jordan, N., Mortensen, D. A., Prenzlow, D. M. & Cox, K. C. (1995). Simulation analysis of crop rotation effects on weed seed banks. *American Journal of Botany*, 82, 390–398.
20. Kromp, B. (1999). Carabid beetles in sustainable agriculture: Review on pest control efficacy, cultivation impacts and enhancement. *Agriculture Ecosystems and Environment*, 74, 187–228.
21. Marino, P. C., Westerman, P. R., Pinkert, C. & van der Werf, W. (2005). Influence of seed density and aggregation on post-dispersal weed seed predation in cereal fields. *Agriculture, Ecosystems and Environment*, 106, 17–25.
22. Mauchline, A. L., Watson, S. J., Brown, V. K. & Froud-Williams, R. J. (2005). Post-dispersal seed predation of non-target weeds in arable crops. *Weed Research*, 45, 157–164.
23. Menalled F. D., Smith, R. G., Dauer, J. T. & Fox, T. B. (2007). Impact of agricultural management on carabid communities and weed seed predation. *Agriculture, Ecosystems and Environment*, 118, 49–54.
24. Menalled, F. P., Marino, P., Renner, K. & Landis, D. (2000). Post-dispersal weed seed predation in crop fields as a function of agricultural landscape structure. *Agriculture, Ecosystems and Environment*, 77, 193–202.
25. Muñoz, A. A. & Cavieres, L. A. (2006). A Multi-species assessment of post-dispersal seed predation in the central Chilean Andes. *Annals of Botany*, 98, 193–201.
26. Povey, F. D., Smith, H. & Watt, T. A. (1993). Predation of annual grass weed seeds in arable field margins. *Annals of Applied Biology*, 122, 323–328.
27. Pullaro, T. C., Marino, P. C., Jackson, D. M., Harrison, H. F. & Keinath, A. P. (2006). Effects of killed cover crop mulch on weeds, weed seeds, and herbivores. *Agriculture, Ecosystems and Environment*, 115, 97–104.
28. Tooley, J. A., Froud-Williams, R. J., Boatman, N. D. & Holland, J. M. (1999). Laboratory studies of weed seed predation by carabid beetles. In: *Proceedings of the Brighton Crop Protection Conference, Weeds*, pp. 571–572.
29. Westerman, P. R., Hofman, A., Vet, L. E. M. & Van der Werf, W. (2003a). Relative importance of vertebrates and invertebrates in epigeic weed seed predation in organic cereal fields. *Agriculture, Ecosystems and Environment*, 95, 417–425

30. Westerman, P. R., Wes, J. S., Kropff, M. J. & Van der Werf, W. (2003b). Annual losses of weed seeds due to predation in organic cereal fields. *Journal of Applied Ecology*, 40, 824–836.
31. Willott, S. J., Compton, S. G. & Incoll, L. D. (2000). Foraging, food selection and worker size in the seed harvesting ant *Messor bouvieri*. *Oecologia*, 125, 35–44.
32. Willson, M. F. & Whelan, C. J. (1990). Variation in post-dispersal survival of vertebrate-dispersed seeds: effects of density, habitat, location, season and species. *Oikos*, 57, 191–198.