

( )

\*

( / / : / / : )

GMP STI

M12 M4

Williams M4

M10

Wisconsin

واژه های کلیدی:

%

(FAO, 2006)

:

%

(Sionet & Kramer, 1977)

C<sub>3</sub>

CO<sub>2</sub>

(Fernandez, 1992)

III

(Daneshian et al., 1999)

(Fredrick et al., 2001; Heatherly, 1993; Sionet & (2002) Zareae .Kramer, 1977)

( )

M <sub>12</sub>	Oliwa cowa
Adepta S-R-21-177	Warsza Wska
Zalta Zalha	SRF × Colombus
Williams × Ronak	Vacvoka
Ronak	Donalcoc
Harper	M <sub>29</sub>
M <sub>13</sub>	Clean
M <sub>10</sub>	NSQB
Union	Erfort
Williams	Wisconsin
	M <sub>4</sub>

(Daneshian et al., 1999)

(Chaves et al., 2002)

(Koochaki & Sarmadnia, 1998)

(Fredrick et al., 2001;

.Hoogenboon et al., 1987)

/

(Sapara & Anaele, 1990;

.Heatherly et al., 1997; Kpoghomou et al., 1990)

( )

(Fernandez, 1992)

( )

$$(SSI) = [1 - (Y_s / Y_p)] / SI$$

$$(GMP) = (Y_s \times Y_p)^{1/2}$$

$$(STI) = (Y_s \times Y_p) / (Y_p^-)^2$$

:Y<sub>p</sub>

:Y<sub>s</sub>

:Y<sub>p</sub><sup>-</sup>

:Y<sub>s</sub><sup>-</sup>

(1977) Fehr & Caviness

(3-D plot)

SPSS

%

IR-8000

Hoogenboon et al.

Mstatc

(1987)

SPSS

$$(SI) = 1 - (Y_{s^-} / Y_{p^-})$$

$$(MP) = (Y_s + Y_p) / 2$$

$$(TOL) = (Y_{p^-} - Y_s)$$

- 
- 3. Tolerance
  - 4. Stress Susceptibility Index
  - 5. Geometric Mean Productivity
  - 6. Stress Tolerance Index

- 
- 1. Stress Intensity
  - 2. Mean Productivity

Vacvoca Donalacoc ( )

Adepta S-R-21-177

(Adepta S-R-21-177) (Vacvoca Donalacoc )

% / % /

Williams

(Wisconsin) (NSQB)

% / % /

)

( )

,

%

Adepta S-R-21-177

.( )

(1999) Daneshian et al.

(M29)

( / )

( )

(Vacvoca Donalacoc)

(2001) Fredrick et al.

%

(1997) Heatherly et al.

(1995) Palmer et al. (1997) Heatherly et al.

(2002) Zareae .

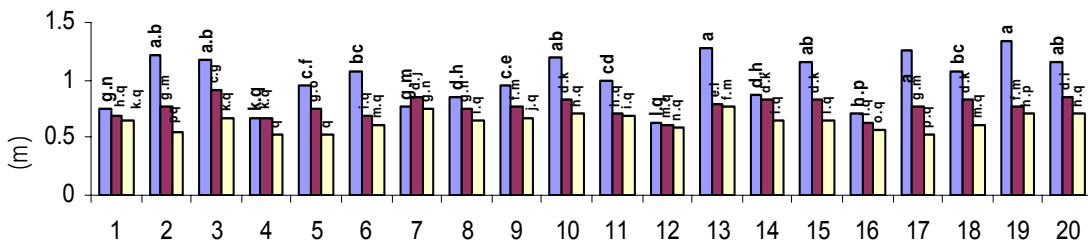
(% / / % / )

.(Chaves et al., 2002)

% / % / % /

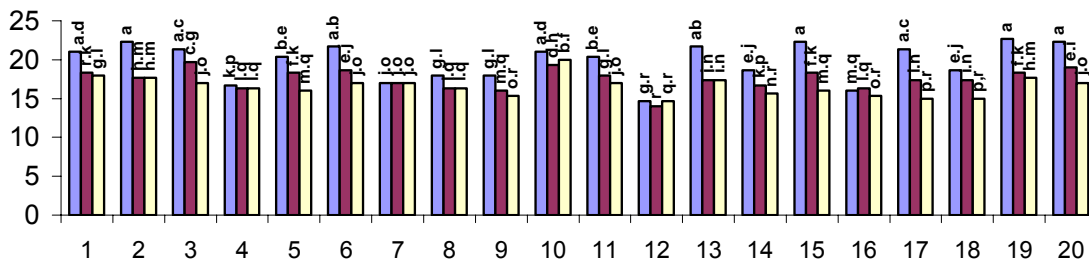
%

(1977) Sionet & Kramer



شکل ۱- اثر متقابل تنش و رقم در صفت ارتفاع بوته سویا

■ ■ ■



شکل ۲- اثر متقابل تنش و رقم بر صفت تعداد گره در ساقه سویا

■ ■ ■

(1994) De Bruyn et al. )

(% / % / % /

% / % / )

.(% /

%

%

% /

% /

.( )

% / % / )

(2004) Zeinali Khanghah et al. .(% /

...

(M4, M12, Wisconsin)

(2001) Karegar

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

( )

)

.(

( )

)

( )

)

% /

(

.(% /

( )

%

(1989) Dornbos et al.

/

)

.( /

%

-

)

(%

% /

% /

Williams M<sub>4</sub>

Wisconsin

GMP STI

( )

NSQB Wisconsin Union Clean Oliwa cowa

(GMP)

(MP)

Adepta S-R-21-177 Harper Ronak Zalta Zalha

(SSI)

(TOL)

M<sub>12</sub>.

(STI)

Erfort M<sub>10</sub>

Vacvoka Donalcoc

STI GMP

(Yp)

(Ys)

(M4)

STI GMP TOL MP SSI :

( )

( )

GMP STI

(D C B)

A

X-Y

(GMP)

D C B A :

(1992) Fernandez

STI . A

(MP)

(A)

(B)

(C)

STI

(D)

M<sub>12</sub> M<sub>4</sub> M<sub>10</sub>

Williams M<sub>4</sub>

( )

A

Wisconsin

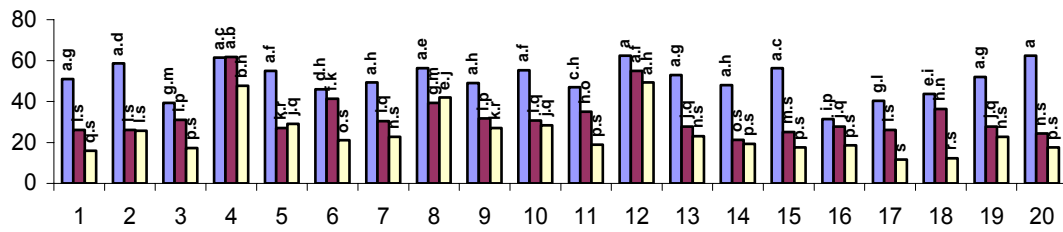
M<sub>4</sub>

GMP STI

M<sub>10</sub> M<sub>12</sub>

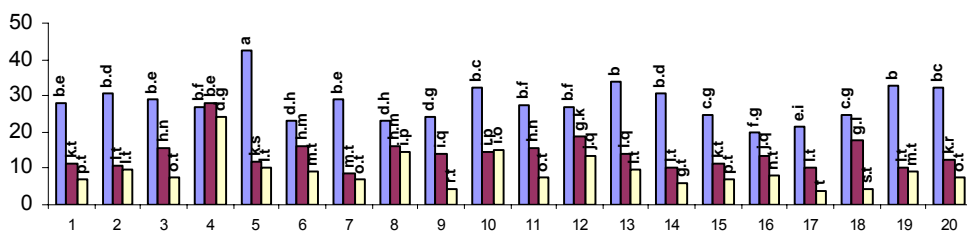






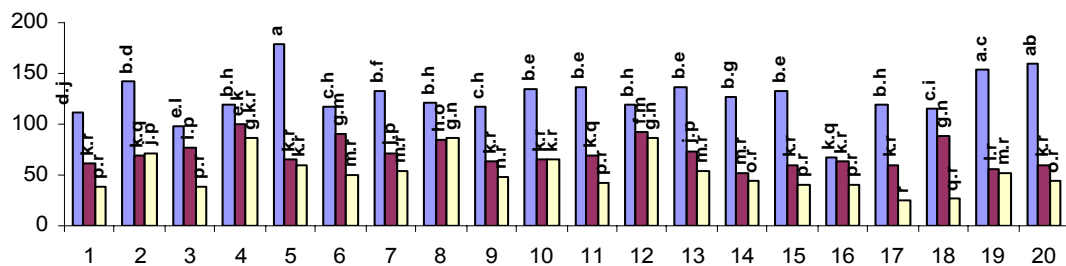
شکل ۳

تنش در فاز رویشی و زایشی    تنش در فاز زایشی    بدون تنش



شکل ۴- اثر متقابل تنش و رقم در صفت وزن غلاف در بوته در سویا

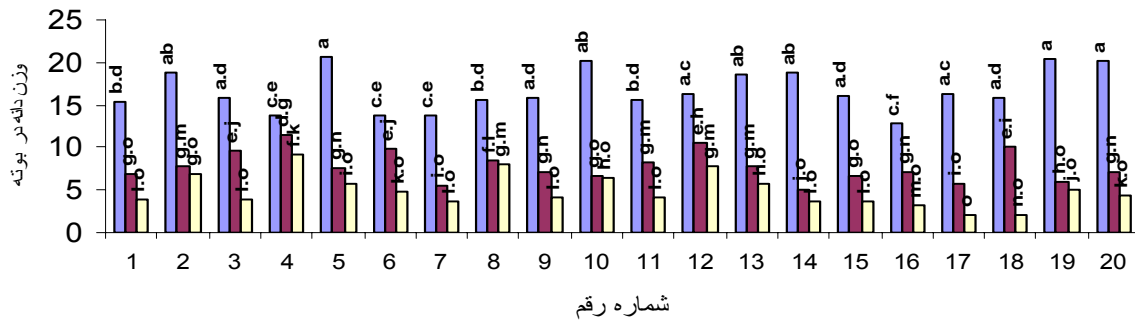
تنش در فاز رویشی و زایشی    تنش در فاز زایشی    بدون تنش



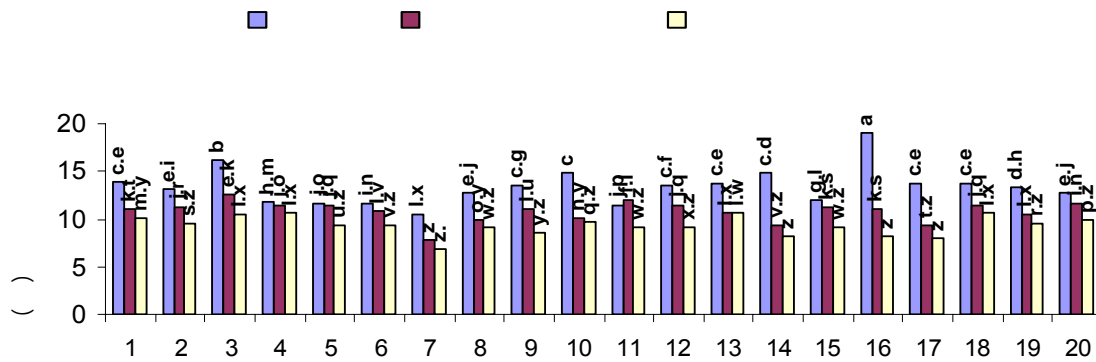
شکل ۵- اثر متقابل تنش و رقم در صفت تعداد دانه در بوته در سویا

تنش در فاز رویشی و زایشی    تنش در فاز زایشی    بدون تنش





شکل ۶- اثر متقابل تنش و رقم در صفت وزن دانه در بوته در سویا



شکل ۷- اثر متقابل تنش و رقم بر صفت وزن صد دانه سویا

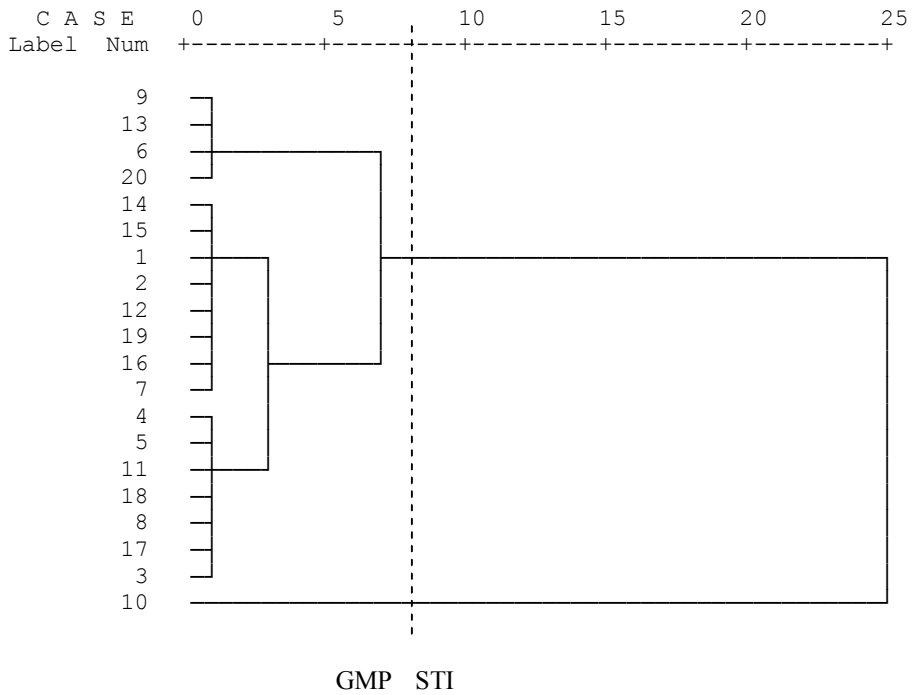
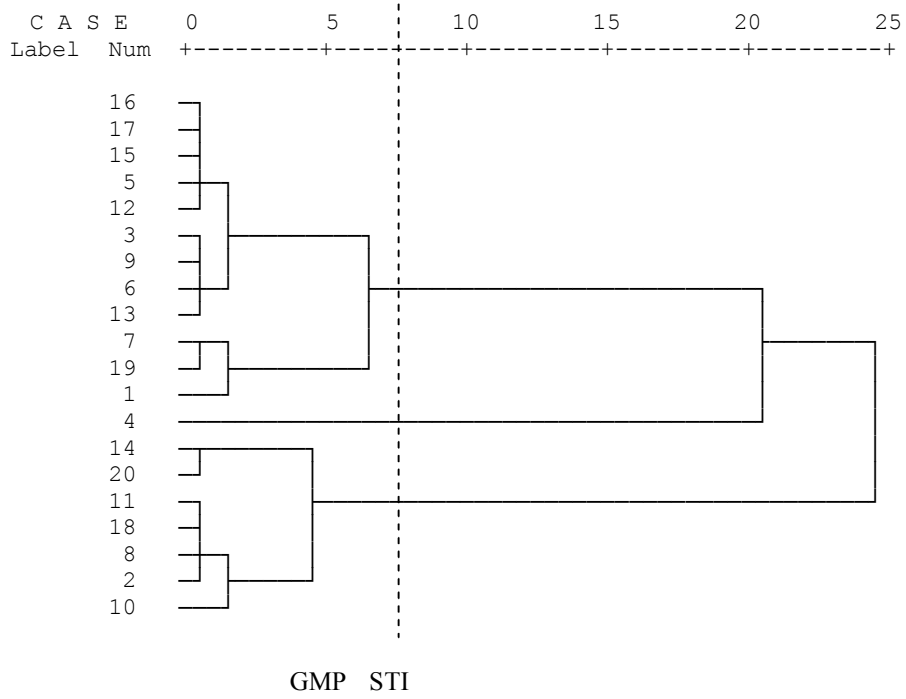
	GMP			STI					
	yp	ys <sup>1</sup>	ys <sup>2</sup>	STI1	GMP1	RANK1	STI2	GMP2	RANK2
Oliwa cowa	/	/	/	/	/	/	/	/	/
Warsza Wska	/	/	/	/	/	/	/	/	/
SRF × Columbus	/	/	/	/	/	/	/	/	/
Vacvoka Donaloc	/	/	/	/	/	/	/	/	/
M <sub>29</sub>	/	/	/	/	/	/	/	/	/
Clean	/	/	/	/	/	/	/	/	/
NSQB	/	/	/	/	/	/	/	/	/
Erfort	/	/	/	/	/	/	/	/	/
Wisconsin	/	/	/	/	/	/	/	/	/
M <sub>4</sub>	/	/	/	/	/	/	/	/	/
M <sub>12</sub>	/	/	/	/	/	/	/	/	/
Adepta S-R-21-177	/	/	/	/	/	/	/	/	/
Zalta Zalha	/	/	/	/	/	/	/	/	/
Williams × Ronak	/	/	/	/	/	/	/	/	/
Ronak	/	/	/	/	/	/	/	/	/
Harper	/	/	/	/	/	/	/	/	/
M <sub>13</sub>	/	/	/	/	/	/	/	/	/
M <sub>10</sub>	/	/	/	/	/	/	/	/	/
Union	/	/	/	/	/	/	/	/	/
Williams	/	/	/	/	/	/	/	/	/

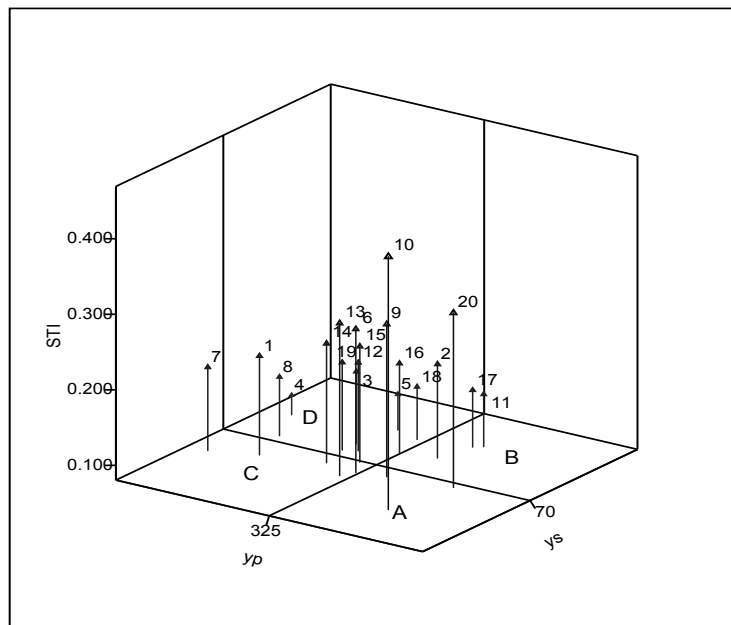
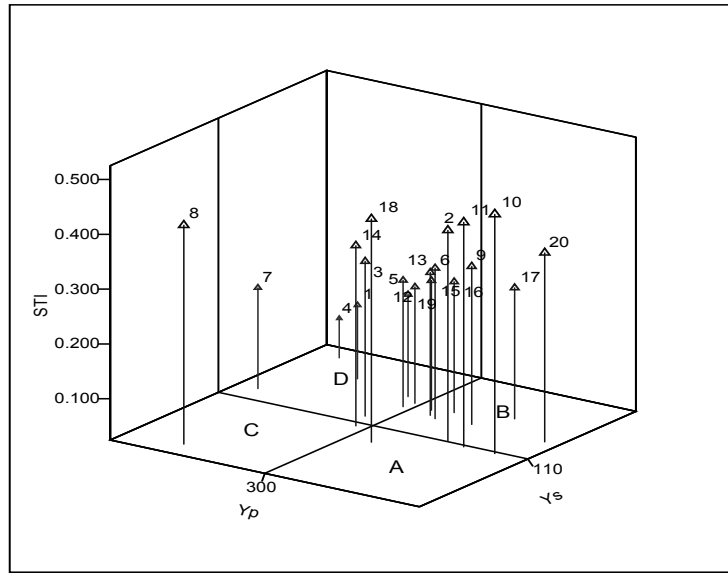
( SI= / )

( SI= / )

	Yp	Ys	TOL	MP	SSI	STI	GMP
Yp		/	/ **	/ **	/ *	/ **	/ **
Ys	/		/	/ *	/ **	/ **	/ **
Yp		/	/ **	/ **	/ **	/ *	/ **
Ys	/		/	/	/ **	/ **	/ **

. %    %            . \*\* \*





(STI)

(YS)

(YP)

( )

( )

## REFERENCES

1. Bennett, J. M. & Albrecht, S. L. (1983). Drought and flooding effects on N<sub>2</sub> fixation and water relations and diffusive resistance of soybean. *Agronomy Journal*, 76, 735-740.
2. Bowers, G. R., Nelson, L. R. & Firch, G. A. (1989). *A drought avoiding soybean production system for northeast Texas*. Miscellaneous publication Texas. Agricultural experiment station. 12 PP.
3. Chaves, M. M., Pereira, J. S., Maroco, J., Rodrigues, M. L., Ricardo, C. P. P., Osorio, M. L., Carvalho, I., Faria, T. & Pinheiro, C. (2002). How plants cope with water stress in the field? Photosynthesis and Growth. *Annals of Botany*, 89, 907-916.
4. Daneshian, J., Majidi, E., Hashemi-Dezfouli, A. & Nour-Mohamadi, G. (1999). Effect of drought stress on quantitative and qualitative characteristics of two soybean [*Glycine mex* (L.) Merr.] cultivars. *Iranian Journal of Crop Sciences*, 1 (3), 35-46. (In Farsi).

5. De Souza, P. I., Egli, D. B. & Bruening, W. P. (1997). Water stress during seed filling and leaf senescence in soybean. *Agronomy Journal*, 89, 807-812.
6. De Bruyn, L. P., Pretovius, J. P. & Human, J. J. (1994). Water sensitive periods during the reproductive growth phase of *Glycin max.* L. establishing water stress sensitivity. *Agronomy and Crop Science*, 174, 233-237.
7. Dornbos, D. L., Mullen, R. E. & Hammond, E. G. (1989). Phospholipids of environmentally stressed soybean seeds. *Journal of American Oil Chemists Society*, 66(9), 1371-1373.
8. Fehr, W. R. & Caviness, C. E. (1977). *Stages of soybean development*. Iowa State University, University Extension, from <http://www.extension.iastate.edu/Publications>
9. Fernandez, G. C. J. (1992). Effective selection criteria for assessing plant stress tolerance. In: Kuo, C.G. (Ed.), *Adaptation of Food Crops to Temperature and water stress*. (pp. 257-269).
10. Food and Agriculture Organization. (2006). *Biodiversity: Agricultural biodiversity in FAO*. Retrieved December 2006, from <http://www.fao.org/biodiversity>
11. Fredrick, J. R., Camp, C. R. & Bauer, Ph. J. (2001). Drought-stress effects on branch main stem seed yield and yield components of determinate soybean. *Crop Science*, 41, 759-763.
12. Gaska, J. M. & Boerboom, C. M. (1999). *Soybean performance in the Midwest, report*. <http://WWW.soils.wisc.edu/extension>.
13. Heatherly, L. G. (1993). Drought stress and irrigation effects on germination of harvested soybean seeds. *Crop Science*, 33(4), 777-781.
14. Heatherly, L. G., Russell, W. J. & Hinckley, T. M. (1997). Water relations and growth of soybeans in drying soil. *Crop Science*, 17, 381-386.
15. Hoogenboom, G., Peterson, C. M. & Huck, M. G. (1987). Shoot growth rate of soybean as affected by drought stress. *Agronomy Journal*, 79, 598-607.
16. Hudak, C. M. & Patterson, R. P. (1995). Vegetative growth analysis of a drought-resistant soybean plant introduction. *Crop Science*, 35, 464-471.
17. Karegar, M. A. (2001). *Identification of drought tolerance indices in soybean genotypes*. B.S. dissertation, Azad University of Karaj, Tehran. (In Farsi).
18. Koochaki, A. (1997). CIGR handbook of *Agriculture In Dry Lands: Cereals, Legums & forage crops*. (pp. 135-138). Jahad Daneshgahi Mashhad co. (In Farsi).
19. Koochaki, A. & Sarmadnia, Gh. (1998). CIGR handbook of *Physiology of Crop Plants*. (pp. 248-288) Jahad Daneshgahi Mashhad co. (In Farsi).
20. Kpoghomou, B. K., Sapra, V. T., Beyl, C. A. (1990). Sensivity to drought stress of three Soybean cultivars during different growth stages. *Journal of Agronomy and Crop Science*, 164(2), 104-109.
21. Palmer, J., Dunphy, E. J. & Reese, P. (June 1995). Manage in drought stressed soybean in the south east. <http://www.cesncsu.Edu/drought/dro-24.html>
22. Sapara, V. T. & Anaele, A. O. (1990). Screening soybean genotypes for drought and heat tolerance. *Soybean Genetics Newsletter*, 17, 134-139.
23. Sionet, K. & Kramer, P. J. (1977). Effect of water stress during different stages of growth of soybean. *Agronomy Journal*, 62, 274-278.
24. Whitehead, W. F. & Allen, F. L. (1990). High-vs low stress yield test environments for selecting superior Soybean lines. *Crop Science*, 30, 912-918.
25. Wilcox, J. R. (1987). *Soybeans: Improvement, Productions and uses*. Madison, Wisconsin, USA. 1987.
26. Yongmoon, J., Hong Suk, L. & Sukha, L. J. (1997). Growth and yield responses of soybean cultivars to drought stress at early growth stage. *Korean Journal of Crop Science*, 42(2), 220-227.
27. Zareae, M. (2002). *Evaluation of Soybean lines and cultivars reaction to drought stress*. B. S. dissertation, Azad University of Karaj, Tehran. (In Farsi).
28. Zeinali Khanghah, H., Izanloo, A., Hosein Zadeh, A. H. & Majnoon Hoseini, N. (2004). Determination of the suitable drought resistance indices in commercial soybean varieties. *Iranian Journal of Agricultural Sciences*, 35(4), 885-899. (In Farsi)