Evaluating Competition of the *Phalaric minor* in Wheat

Einallah Hesammi

Faculty member, Department of Agronomy, Islamic Azad University, Shoushtar Branch. Iran
a.hesami@iau-shouhtar.ac.ir and ainellah@yahoo.com

Abstract: to competitive effects of wheat and *p minor* in densities and different use values of Nitrogen in plan frame of random blocks repeating 4 times perfectly. The test factorials included Nitrogen value in level (100,150 and 225 kg/ha) and *p minor* density in 5 levels (0, 20, 40, 80 and 160 bones per square meter). Results of the test showed that height of *p minor* per three values of Nitrogen was less in initial processes of growth and more than wheat in final processes of growth. Increasing Nitrogen value has caused to increase leaf and biomass of *p minor* and increasing *p minor* density causes area of leaf and biomass of wheat to decrease. Time of closing canopy in *p minor* is more rapidly than in wheat. The most value of decreasing operation of wheat seed was about 48 percent while was observed in density of 160 bones of *p minor* in 225 kg/ha of Nitrogen. Average relative growth velocities of wheat and *p minor* were 0.073 and 0.028 g/dag during growth cycle, respectively. Little use value of Nitrogen fertilizer, reason of more decrease of wheat operation was existence of *p minor* grass.
[Einallah Hesammi Faculty member, Department of Agronomy, Islamic Azad University, Shoushtar Branch. Iran. Journal of American Science 2011; 7(7):674-678]. (ISSN: 1545-1003). http://www.americanscience.org

Keywords: Wheat, *p minor*, Competition, Nitrogen, Density

1. INTRODUCTION

Phalaric minor exists in most of Iran provinces as a result of consistency with different conditions of biology and ecology; also, it is a most common species of grass. In modern management of grasses, emphasis is on management of grass societies instead of try to cancel them which needs modernized relations of grasses with agro plant to be known a curtsy. Understand relations of agro plant and grasses for management to be used in long-term needs competition in view of grasses to be considered (Mortimer et al. 1997). Competitive effects of grasses on a product would be affected with the both species (Carlson et al. 1985). Plants are in competition for resources like light, water and (mineral) nutrients. Such resources are distributed among plants that require them crucially.

As there is a linear relation between biomass generating and absorption of growth limiting resources, biomass is reflector plant of limited distributed among them. According to variable distribution of dry material in plants bodies with competition stresses, inter competition in plants throughout measuring total biomass. Competition is a complicated event that in under influencing by different biologic, environmental and vicinity factors. According to relation of operation, density and present resources, plant density is an important factor in study of competition. Effect value of grasses on wheat operation depends on different factors like kind and density of grass bone, agro type, and value and time period of used fertilizer, date and rows and other ecological conditions.

For example, *wild oat* and *Brassica Kaber* are better than wheat in receiving soil Nitrogen while in optimum conditions of agriculture; these two grasses are more effective in decreasing operation of this agro plant as a result of wider growth (Henson et al. 1982). In samples associated with *wild oat*, when its density was %106 green cover, increase of neither Nitrogen fertilizer nor cause to increase in wheat operation of course caused it to be decreased notably(Carlson et al. 1985). Agriculture with small type in compare with high type one increases Spike, seed product and dry weight of *wild oat* about 80-100 (Torner et al. 1986). Studies in Khuzestan showed when density of *A. Ludoviciana* was about 70 bones per square meter; wheat operation was decreased to %66. Competition of *A.Ludoviciana* and wheat is variously depending on product type and grass density (Attalian et al. 2003). According to this fact that competition of grass and agro plant differs influencing by ecological conditions. Among food materials, Nitrogen is the one that follows worry relating with competition of grasses; many researches about effect of Nitrogen on competition of agro plants with grasses. Increasing Nitrogen fertilizer in wheat associated with *wild oat* causes grass density to me increased and agro plant operation to be decreased (Carlson et al. 1986). Increasing Nitrogen value in rice was in favor of *Cyprus rotundus* and caused right absorption, leaf area index and rice operation to be decreased together (Okafor et al. 1976). *Chenopodium album* and *polygonum convolvulus* show better reaction in higher levels (Haas et al. 1982). *Brassica kaber* was increased

while increasing Nitrogen in soil from 20 to 120 mg/kg in soil and responded more than wheat (Iqbal et al. 1997). In spite of increasing operation of agro product due to fertilizer use without competition conditions, on the other hand causes density and biomass of grasses to be increased too which it may be followed with increasing seed product and since it can have had a positive correlation with biomass, so fertilizer uses such as Nitrogen will be affective on seed product (Fawcett et al. 1978). this research was done to consider competitive reaction of wheat with variation value of used fertilizer of Nitrogen and density of *p minor* to appoint competition effects on biological and economical operations of wheat; in fact wheat response to Nitrogen fertilizer ready for *p minor* competition for competitive effects of this grass.

2. materials and methods

This research was done in 2010 agro year in Islamic Azad University, Agriculture college, including two factors: Nitrogen use value in three levels (N1=100, N2=150 and N3=225 kg/ha) and density of *p minor* in five levels (0, 20, 40, 80and160bones per square meter).

This research was done in 4 random blocks plan frames of factorial type. Kind of used wheat name d CHAMRAN was applied with density of 450 bones per square meter by seed system distancing 17 cm of the considered one. Phosphorus fertilizer was used 150 kg/ha with seed. This agro operation was done associating with using 1/3 fertilizer in each processes of operation. Width of each field scene was considered as 3m and distance between each two scenes was considered as 2m canceling effects among different Treatments. Length of each scene was 6m with 2m distance between each two blocks (reputation). There were 5 bones per scene while past agro was vegetables type. Soil sampling showed existence of 21.6ppm mineral Nitrogen to 60cm depth in the field soil. Rows of *p minor* were between each two separate rows of wheat while each level had a distance 20cm of the other row and 10cm with the nearest wheat one. Break of rest (sleep) for *p minor* was done with making them wet for 20 hours in water and then compactness with Gibberellins acid (350 ppm). Other required watering was done according to plant needs in season. All of grasses except *p minor* were cancelled by 2, 4-D herbicide system and manually. Doing the research, there was no illness and death. To consider growth trend from the last of wheat preparing, measurements of height, leaf area and dry weight of each sample were done after random taking wheat plant and *p minor* from level of 0.2 square meters. After closing canopy, general distribution of level on samples was measured in 5 levels with 25cm in thickness (0-25, 25-50, 50-75, 75-100,100-125). Analysis of data and drawing diagrams needed were done by using sigma plot, MSTATC and Excel and to compare averages, Dankan multi domain test in probability level 5 percent was used.

3. Result and discussion

A. Wheat height and p minor

The height of species was influenced by value of Nitrogen fertilizer while varying used Nitrogen fertilizer from 100 to 150 kg/ha caused to increase the wheat height and increasing from 150 to 225 kg/ha caused it to increase height of *p minor*. Increasing density of *p minor* didn't affect on wheat height to 40 bones on *p minor* to 80 bones, so after densities of 40 and 80 bones of *p minor* a notably increasing in height. In seems that planting of *p minor* happens sooner that wheat and it limits space development for wheat has more capability to absorb Nitrogen around wheat bone through bones interacting (Martin et al. 1998). And as a result of being height due to desirable use of *p minor*, it takes 95 days after planting more rather than wheat that height increasing happen till the end of growth season. Height has an important role in competition process so that increasing Nitrogen from 100 to 225 kg/ha, height of wheat decreased from 103.18 to 105.8 cm (Table1). Often being higher the wheat, height of *p minor* was more improved than wheat so that its final height was 12-14 cm more than wheat (Cudney et al. 1989). Interaction of light absorption and photosynthesis in wheat is as a result of big height of *p minor*, that is shown using competition of *p minor* with wheat in the last of capability season of competition.

TABEL I. Compare of averages of main effects on different areas in competition of P. minor

Timours	Height(cm)		Leaf Area Index	
N	wheat	p. minor	wheat	p. minor
100	92.81 a	103.18 b	3.6a	0.35 b
150	90.5b	102.12b	3.6 a	0.49 c
225	88.37c	105.8a	3.4b	0.62 a
p. minor D(p/m2)				
0	88.6 c		3.8 a	
20	89.1c	101.7b	3.8a	0.15 d
40	89.3c	102.1b	3.6b	0.26 c
80	91.3b	102.7b	3.3c	0.5 b
160	94.7a	104a	3.09d	0.91 a

In each column means followed by similar letters are not significantly different (p=%5)

B. Index of leaf area

This index was under influence of value of Nitrogen fertilizer used both species of wheat and *p*

minor. Considering data of the index showed that variation of value of Nitrogen fertilizer from 100 to 225 kg/ha has been caused the above index to be decreased from 3.6 to 3.4 for wheat (Table1). On the other hand, density of *p minor* with increasing from 0 to 1610 bones per square meter caused the index of wheat to be decreased from 3.81 to 3.9(Table 1). Statistical analysis of the data in 145 days after planting having maximum of the leaf area showed that increasing the Nitrogen used would increase the index of leaf area of *p minor* (Table1) and also density of *p minor* increased from 0.15 to 0.91 (Table1). increase of density due to decrease of nutrient value particularly and increase of shadowing causes oldness and leaf falling particularly down of canopy which it will be followed in decreasing area of leaf of wheat (Iqbal et al. 1997). Distribution of leaf area of the species showed that *p minor* grass has the most density of leaf area in 50-75 cm layer and wheat in 25-50 cm one(Hasanzade et al. 2000). Increasing *p minor* from 20 to 160 bones was associated with decrease in index of wheat leaf area and increase in index of *p minor* leaf area has known index of leaf area as the best criteria of expressing the capability of photosynthesis and authority for growth of each species (Potter et al. 1977). Considering relative share showed that percentage of leaf area of *p minor* was very little rather then wheat and was 26 percent of leaf area of canopy related to *p minor* in the highest level of the *p minor* of 160 bones per square meter. with and wheat in different values of used Nitrogen, index of leaf area for Wild oat is less than wheat, since that competition capability of *p minor* was reported more than wheat and it was said that further photosynthesis level of each species, there are other effective factors in competition capability like distributing leaves inter canopy (Cudney et al. 1989). So height, index of leaf area and vertical distribution of leaves inter canopy through competition process (Kropff et al. 1981). Expressed that the suitable criteria for evaluation of decrease value of agro plant operation is a close relation between decrease of plant operation and ratio of leaf area of grass. It was observed that the highest level of index of *p minor* leaf area in about through 145 days after field working and the most index of leaf area wheat CHAMRAN kind about 160 days of it expressing that *p minor* canopy is closed easier than wheat. It was expressed that time of closing the canopy of agro plant and grass is an important in competition process and plant which reaches this stage, has higher competition capability (Cousense et al. 1991). Comparing distribution of leaf area shows that wheat has the most index of leaf area in 25-50 cm layer and *p minor* in 50-75 cm layer. So use value of Nitrogen fertilizer is effective on distribution of wheat leaf area. So that is concentrated in use value of 100kg Nitrogen per hare with maximum index of leaf area in 25-50 cm layer that increase of Nitrogen fertilizer, index of leaf area of wheat increases in 50-75 cm layer. On the other hand, general distribution of leaf area index in *p minor* is concentrated in middle of canopy rather than the other layers. The most of index of leaf area for *p minor* in dependent on environmental conditions is concentrated in upper half of canopy *p minor* having more index of leaf area to the upper layers, has more capability rather than wheat for reaction with high competition. The speed of being yellow for leaves of down layers of wheat was more than wild oat (Beyschlag et al. 1990). In *p minor*, Nitrogen consumption was increased from minimum value to maximum one in index of leaf area for the upper layers, that seems Nitrogen consumption causes index of leaf area transport to the upper layers through increasing height and inter nodes.

C. Speed of products growth

Increasing density of *p minor* and speed of *p minor* growth will be less with little value of Nitrogen rather than higher level and speed of *p minor* growth has been in ceased with increase to 225kg Nitrogen per hear (Figs. 1, 2). Increase of *p minor* density causes decrease of leaf area of wheat, so speed of wheat growth will decrease.

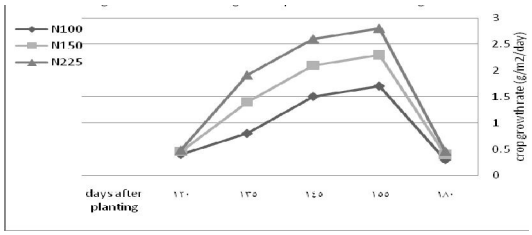

Figure 1. Variation of wheat growth speed in different nitrogen

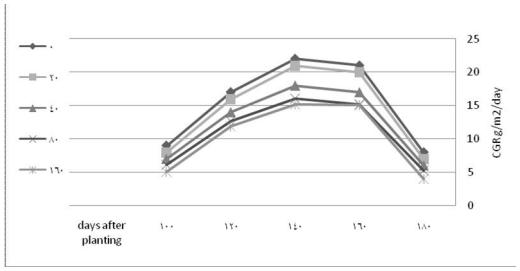

Figure 2. Wheat CGR changes in different P. minor density

D. Speed of relation growth

Speed of relative growth for is more than it for wheat. Speed of relative growth for *p minor* was very

low at first and it was less than it for wheat too. But as a result of suddenly increase of leaf area of *p minor*, speed of relative growth increased after a period of 95-115 days from harvesting. Speed of relative growth decreases for wheat and grass of *p minor*. Speed of relative growth was lees than wheat in growing season early but increased after that rather than wheat (Cousense et al. 1991). Nitrogen increase caused speed of relative growth of *p minor* to increase. Increase of *p minor* density affected on speed of relative growth for wheat. When height of *p minor* is less than it for wheat in growth early, but it will be more using Nitrogen fertilizer and better competition conditions, so *p minor* will shade on canopy of wheat and its speed of relative growth will effect on wheat.

E.Economic operation

Economic operation was effected by *p minor* density, Increase of density to 80 and 160 bones per square meter caused wheat operation to decrease. This value was 341 kg/ha for increase of density from 40 to 160 bones of *p minor*. That is, wheat operation decreases when increase of bones per square meter and this value will be 2.8 kg/ha. If *p minor* would not be controlled with 20 per square mater value till product season (Caussanel et al. 1993), decrease of wheat operation will be 8.7-21.8 percent. Decrease of wheat operation was 33.9 to 54.2 percent (Salimi et al. 1996). Economic operation comparison of wheat rather than Timor without *p minor* in the less and most values of Nitrogen use showed that wheat operation decreases when *p minor* density increases. So that in the less value of Nitrogen, decrease of operation was 29 percent when *p minor* density increased to 160 bones per square meter whiles it was 37 percent when increase value of Nitrogen was 160 bones per square meter in *p minor* density. This comparison showed that competition power of *p minor* increases when Nitrogen and *p minor* density increase. Have known wheat operation decrease in competing wild oat due to decrease of cluster number (Angonin et al. 1996). Competition of *p minor* decrease seed number of wheat in up levels of grass density and up levels of Nitrogen. Simultaneously of quick growth rate for *p minor* height and wheat sprayings, applied shading of leaves causes wheat seed number and economic operation to decrease. A given trend was observed for effect of *p minor* density and Nitrogen effect on harvest index. Nitrogen value affects on wheat index with up level density of grass. Increase of Nitrogen caused wheat index to decrease. So decrease of operation was more than before it when *p minor* density and Nitrogen increase.

4. CONCLUSION

Wheat operation expresses inter species competition of this grass in upper levels (Cousens et al. 1985). Application of upper values for Nitrogen fertilizer cause wheat product per area unit as a result of its given effect on biomass and created leaf area per area unit. Also it was recognized that lower densities of *p minor* with less values of Nitrogen causes economic operation to more values. According to growing ability and much shading with long height for *p minor* and seeds produce, managing this grass through less density and seeds bank per area unit causes this grass to decrease; unavoidable use of chemical fertilizers should be done in base of pollution values of *p minor* and gullibility of seeds bank when pollution of this grass reaches to up levels.

At first, pollution was decreased using management affairs and then chemical fertilizer should be used with desired values.

Acknowledgements:
Department of Agronomy, Islamic Azad University, Shoushtar Branch

Corresponding Author:
Einallah Hesammi
Faculty member, Department of Agronomy, Islamic Azad University, Shoushtar Branch. Iran
E-mail:a.hesami@iau-shouhtar.ac.ir

REFERENCES

1. Angonin, C., J.P., Caussanel, and J. M. Meynard. 1996. Competition between winter wheat and *Veronica hederifolia*: Influence of weed density and the amount and timing of nitrogen application. Weed Res.36: 175-187.
2. Attalian, Amir Medi and Rashed. M.H., 2003. Consideration of levels effects different globalities for wild oat on operation and compoents of 3 kind's winter wheat, Kermanshah Razi University, p.63.
3. Beyschlag, W, P.W.Barnes, R.Ryle, M.M.Caldwell, and S.D.Flint. 1990. Plant competition for light analyzed with a multispecies canopy model.II. Influence of photosynthetic characteristics on mixtures of wheat and wild oat. Oecologia 82:374-380.
4. Carlson, H. L. and J. E. Hill. 1985. Wild oat (*Avena fatua*) competition with spring wheat: Plant density effect.Weed Sci. 33: 176-181.
5. Carlson, H. L. and J. E. Hill. 1986. Wild oat (*Avena fatua*) competition with spring

wheat: effects of nitrogen fertilization. Weed Sci., 34: 29-33.
6. Caussanel, J.P., B. Kafis, and A. Carteron. 1993. Yield response of spring wheat to increasing densities of spring oats and various of post-emergence weed control. Agronomie. 13:815-827.
7. Cudney, D. W. L. S Jordan, J.S. Holt and J.S. Reints. 1989. Competitive interactions of wheat (*triticum aestivum*) And wild oats (*avena fatua*) grown at different densities. Weed Sci 37:538-543.
8. Cousens, R. 1985. A simple model relating yield loss to weed density. Ann. Appl. Biol. 107:239-252.
9. Cousense, R.D., S.E. Weaver, T.D. Martin, A.M. Blair and J.Wilson. 1991. Dynamics of competition between wild oat (*Avena fatua L.*) and winter cereals. Weed Research 31:203-210.
10. Haas H. and Streibig J.C. 1982. Changing patterns of weed distribution as result of herbicide use and other agronomic factors. Pages 57-79 IN H.M. Lebaron and J.C.Streibig.,eds. Herbicide Resistance in plants. New York: J.Wiley.
11. Hasan zade Deloee, M. M., Nasiri Mahallati v.q.c., NoorMohamadi 2000, Consideration of competitive effects of wild oat wild winter wheat in different density conditions, Agroscience J., Iran, No. 2.
12. Henson, J. and Jordan, L.S. 1982; Wild oat (*Avena fatua*) competition with wheat (*Triticum aestivum* and *T. turgidum*) for nitrate. Weed Sci. 30, 297-300.
13. Iqbal J. and Wright D.1997. Effects of nitrogen supply on competition between wheat and there annual weed species. Weed Res., 37:391-400.
14. Kropff, M. J. 1988. Modelling the effects of weeds on crop production. Weed Research.28:465-471.
15. Fawcett, R. S. and F. W. Slife. 1978. Effects of applications of nitrate on weed seed germination and dormancy. Weed Sci. 26: 594-596.
16. Lindquist, J.L., B.D. Maxwell, and T. Weaver. 1996. Potential for controlling the spread of *Centaurea maculosa* with grass competition. Great Basin Naturalist, 56:267-271.
17. Martin, J.S., T. C. Harry, J. M. Chandle, W. B.Rodney and K. A. Carson. 1998. above and below ground interference of wheat by Italian Ryegrass. Weed Sci. 46:438-441.
18. Mortimer, M.1997.The need for studies on weed ecology to improve weed management. Expert consultation on weed ecology and anagement. F.A.O. Report.
19. Okafor L.I. and D. E. Datta S.K.1976. Competition between upland rice and purple nut sedge for nitrogen, moisture and light. Weed Sci., 24:43-46
20. Potter, J.R. and J.W. Jones. 1977. Leaf partitioning as an important factor in growth. Plant physiol. 59:10-14
21. Salimi, Hamira and Engji, Jarad, 1996, Consideration of Biology and competition value with different globalities of wild oat kind *ludoviciana avena* in water wheat agro, Karaj Agricultural Education center, p. 67.
22. Torner, C., Fernandez-Quintanilla, C., Navarrete, L. and Sanchez, M.J. 1986; Tolerance and competitive ability of different cultivars of wheat and barley in the presence of *Avena sterilis* L. subsp. ludoviciana (Dur.) Nyman. Weed Abst. 35 (2): 74.

6/7/2011