POPULATION OF APHIDS ON DIFFERENT VARIETIES/LINES OF WHEAT AND THEIR EFFECT ON YIELD AND THOUSANDS GRAIN WEIGHT

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ABSTRACT

An experiment was conducted at Agricultural Research Institute, Tarnab, Peshawar, Pakistan during 2009-2010 to study the population trend of wheat aphids on different varieties/lines of wheat and their effect on the yield and thousands grain weight. Aphids attack started in first week of January, increased during February and March, peaked on 13th March, and then declined afterwards till complete disappearance till 6th April. The overall mean number of aphids per plant was higher on wheat line PR-1 (42.20 aphids per plant), which was followed by Khber-87 (32.57 aphids per plant), Pirsabak-2005 (29.36 aphids per plant), KT-2004 (KT-09) (21.22 aphids per plant), NRL 0302 (Barsat-09) (20.29 aphids per plant), Saleem-2000 (19.92 aphids per plant), Pirsabak-2008 (15.71 aphids per plant), PR-2 (13.34 aphids per plant) and Pirsabak-2004 (12.89 aphids per plant). Wheat yield was highest for Pirsabak 2004 (3048 kg ha⁻¹) lowest for PR-1 (2243 kg ha⁻¹).

KEYWORDS: Triticum aestivum L., aphids, population trend, yield and thousand grain weight.

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INTRODUCTION

Wheat (Triticum aestivum L.) is a nutritious, convenient, economical source, and a source of the basic dietary product – breads which is consumed by more than 70% of the human population. This cereal is grown on 23% of global cultivated area and is of the great importance in bread, diet, pharmaceutic and other industries, but also important product of international trade on world market (Istvan, 2006). Wheat is a staple food in Pakistan.

The varieties/lines tested against aphid’s infestation during 2009-2010.

<table>
<thead>
<tr>
<th>Treatments/ Variety/line</th>
</tr>
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</table>
| T1                      | Pirsabak 2004                           
| T2                      | Pirsabak 2005                           
| T3                      | Pirsabak 2008                           
| T4                      | KT 2004 (KT 2009)                       
| T5                      | Khyber-87                               
| T6                      | PR-1                                    
| T7                      | PR-2                                    
| T8                      | NRL 0320 (Barsat 09)                    
| T9                      | Saleem 2000                             

The following nine wheat varieties/lines were sown on 19th November, 2009 using statistical design RCBD with 9 treatments and replicated 3 times. Each plot size was 28.98 m² and 60 cm buffer area was maintained between the plots and...
also among the blocks. Varieties/lines were sown in straight rows and the row to row distance was 30 cm. Standard agronomic practices were applied to all the plots equally.

**Population Dynamics**

Wheat aphid’s infestation was recorded on weekly basis. For recording the aphid’s population five wheat plants/plot were randomly selected and counting of aphids per plant on leaves, stem and in later stage also on spike was done visually in the field. The average number of aphids/plant for each variety/line was calculated. The data were subjected to statistical analysis using MStat C Package and the means were separated with LSD at P= 0.05.

**Yield Losses Estimation and Thousand Grain Weight**

On reaching maturity the wheat varieties/lines were harvested on 12.5.2010. Each plot was harvested and threshed separately to obtain yield/plot. Random wheat grain samples were taken from each plot for counting thousand grains and these grains were weight separately on electric balance. The data were subjected to statistical analysis using M.State.C Pakage and the means were separated with LSD at P= 0.05.

**RESULTS AND DISCUSSION**

Fig. 1-10 shows the population trend of wheat aphids on different varieties/lines during 2009-2010. Aphids attack was started in first week of January and was increased during February and March and reached to the peak on 13th March, and then the population went down and eliminated completely on all the nine varieties/lines till 6th April.

Maximum number of aphids per plant \( (160.3) \) was recorded on the 13th March on variety Pirsabak 2005 and lowest on PR-2 \( (35.7 \) aphids per plant) was recorded. We received the peak population of aphids on 13th March (2nd week of March), Aheer et al. (2006) and Muhammad et al. (2005) reported the peak aphids population on 23rd March (third week March), Similarly Aslam et al. (2004) observed the peak aphids population on 16th March (third weak March). Farooq and Nasir (2001) reported peak aphid’s population during the mid March and Shuhail et al. (2001) reported peak aphid’s population on 2nd April. We find out that the aphids population became zero on 6th April, Aslam et al. (2004) also recorded that aphids on all the tested wheat varieties was totally eliminated on 6th April But, Shuhail et al. (2001) reported that wheat aphids population became zero on 17th April. This observed difference in the date of peak level and zero population may be due to the difference in the weather factors of different locations. Aheer et al. (2007) also confirmed that combination of all abiotic factors (Temperature, Humidity and rainfall) contribute a significant role in aphids population fluctuation on wheat.

![Graph showing population trend of wheat aphids on different varieties/lines during 2009-2010.](image-url)
Fig. 2. Population trend of wheat aphids on Pirsabak 2005 during 2009-2010

Fig. 3. Population trend of wheat on Pirsabak 2008 during 2009-2010
Fig. 4. Population trend of wheat aphids on KT-2009 during 2009-2010

Fig. 5. Population trend of wheat aphids on Khyber-87 during 2009-2010
Fig. 6. Population trend of wheat aphids on PR-1 during 2009-2010

Fig. 7. Population trend of wheat aphids on PR-2 during 2009-2010
Fig. 8. Population trend of wheat aphids on Barsat-09 during 2009-2010

Fig. 9. Population trend of wheat aphids on Saleem-2000 during 2009-2010

Table I. Yield in kg/ha and thousands grain weight/plot of different wheat varieties/lines during 2009-2010

<table>
<thead>
<tr>
<th>Varieties / Line</th>
<th>Kg/ha</th>
<th>Thousand grain weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pirsabak 2004</td>
<td>3048 a</td>
<td>31.26 abc</td>
</tr>
<tr>
<td>Pirsabak 2005</td>
<td>2933 a</td>
<td>32.96 ab</td>
</tr>
<tr>
<td>Pirsabak 2008</td>
<td>2991 a</td>
<td>28.58 c</td>
</tr>
<tr>
<td>KT-2004 (KT-2009)</td>
<td>2473 ab</td>
<td>32.26 abc</td>
</tr>
<tr>
<td>Khyber-87</td>
<td>2991 a</td>
<td>29.35 bc</td>
</tr>
<tr>
<td>PR-1</td>
<td>2243 b</td>
<td>30.40 abc</td>
</tr>
<tr>
<td>PR-2 NRL 0320</td>
<td>2646 ab</td>
<td>33.47 a</td>
</tr>
<tr>
<td>(Barsat 09)</td>
<td>2876 a</td>
<td>30.53 abc</td>
</tr>
<tr>
<td>Saleem 2000 LSD</td>
<td>2588 ab</td>
<td>32.08 abc</td>
</tr>
<tr>
<td><em>LSD</em></td>
<td>611.6776</td>
<td>3.954</td>
</tr>
</tbody>
</table>

Means sharing the same letters are non-significant at 0.05 alpha level.
The overall mean number of aphids per plant was higher on wheat line PR-1 (28.58 grams/1000 grains) was recorded for line PR-2 and minimum (25.58 grams/1000 grains) for Pirsabak 2008. Thousands grain weight among (KT-09), Saleem 2000, Pirsabak 2004, Barsat-09 and PR-1 was non-significantly different but different from PR-2, Pirsabak 2005, Khyber-87 and Pirsabak 2008.

Yield of wheat and population of aphids were inversely proportional i.e. Pirsabak 2004 had highest yield 3048 kg ha⁻¹ and more thousand grain weight and lowest aphids population as compared to PR-1 had lowest yield 2243 kg ha⁻¹ and less thousands grain weight and highest aphids population. But the statistical analysis shows that this difference is non-significance. Riazuddin et al. (2004) tested 20 wheat lines against the attack of aphids and found overall 3.22% decrease in thousand grain weight in all entries. But the mean thousand grain weight between treated and untreated plot against aphids attack were non-significantly different.

**CONCLUSION AND RECOMMENDATIONS**

The population of wheat aphids should be regularly monitored on different varieties/lines. Aphid’s tolerant/resistant cultivars/varieties should be grown for reducing losses. Environmental friendly pesticides shall be applied against aphids on wheat.

**REFERENCES**


Qamar Zeb et al., Population of aphids on different varieties/lines of wheat…


