

## Impact of Foliar Formulations of Macro and Micro Nutrients on the Tritrophic Association of Wheat Aphid and Entomophagous Insects

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**Abstract :** In Pakistan, wheat (*Triticum aestivum* L.) is seriously attacked by the wheat aphid. Naturally, bio control agents play an important role in managing wheat aphid. However, association among pest, natural enemies and host plant is highly affected by food resource concentration and predator/parasitoid factor of any ecosystem. The present study was conducted to estimate the effect of different dose levels of macro and micronutrients on the aphid population and its entomophagous insect on wheat and their tri-trophic association. The experiment was laid out in RCBD with six different combinations of macro and micronutrients and a control treatment. The data was initiated from the second week of the February till the maturity of the crop. Data regarding aphid population and coccinellids counts were collected on weekly basis and subjected to analysis of variance and mean comparison. The data revealed that aphid population was at peak in the last week of March. Coccinellids population increased side by side with aphid population and declined after second week of April. Aphid parasitism was maximum 25% on recommended dose of Double and Flasher and minimum 8.67% on control treatment. Maximum aphid population was observed on first April with 687.2 specimens. However, this maximum population was shown against the application of Double + Flasher treatment. The minimum aphid population was recorded after the application of HiK Gold + Flasher recommended dose on 15th April. The coccinellids population was at peak level at on 8th April and against the treatment double recommended dose of HiK gold + Flasher. Amount of nitrogen, phosphorus and potassium percentage dry leaves components was maximum (2.33, 0.18 and 2.62 % dry leaves. respectively) in plots treated with recommended double dose mixture of Double + Flasher and Hi-K Gold + Flasher while it was minimum (1.43, 0.12 and 1.77 dry leaves respectively) in plots where no nutrients applied. The result revealed that maximum parasitism was at recommended level of micro and macro nutrients application. Maximum micro nutrients zinc, copper, manganese, iron and boron found with values 46.67 ppm, 21.81 ppm, 62.35 ppm, 152.69 ppm and 36.78 respectively. The result also showed that Over application of macro and micro nutrients should be avoided because it do not help in pest control, conversely it may cause stress on plant. The treatment Double and Flasher recommended dose ratio is almost comparable with recommended dose and present studies confirm its usefulness on wheat.

**Keywords :** entomophagous insects, macro and micro nutrients, tri-trophic, wheat aphid

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