EFFECT OF WEED CONTROL AT DIFFERENT STAGES IN THE GROWTH CYCLE ON THE GROWTH AND YIELD OF ONIONS (Allium ascolonicum L)

BY

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ABSTRACT

Four experiments were conducted at the premises of the Eastern University, the first two experiments to study the effect of weed control at different stages in the growth cycle on the growth and yield of onions and the other two to study the effect of different forms and levels of potassium on leaf tip scorch on growth and yield of onions (Allium ascolonicum L.).

Experiment I

Effect of duration of weed-free periods on growth and yield of onions.

Treatments

T_1 - Weedy throughout
T_2 - Weed-free for the first 2 weeks
T_3 - Weed-free for the first 4 weeks
T_4 - Weed-free for the first 6 weeks
T_5 - Weed-free throughout

At the harvest done at 28 days after planting (28 DAP) weediness for 28 days depressed leaf fresh weight by 58% leaf dry weight by 44%, bulb fresh weight by 43%, bulb dry weight by 43%, root fresh weight by 28%, root dry weight by 24%, number of bulbs by 30% and diameter of bulbs by 27% compared with that in weed-free plots. At the same harvest weed-free condition for 14 days and weediness for 14 days depressed leaf fresh weight by 31% leaf dry weight by 23%, bulb fresh weight by 38%, bulb dry weight by 38%, root fresh weight by 26%, root dry weight by 16%, number of bulbs by 21% and diameter of bulbs by 8% compared to that in weed-free plots.

At the second assessment done at 42 DAP weediness for the entire 42 days depressed leaf fresh weight by 72%, leaf dry weight by 58%, bulb fresh weight by 52%, bulb dry weight by 52%, fresh weight roots by 64%, dry weight roots by 67%, number of bulbs by 41%, and diameter of bulbs by 36% compared to that in weed-free plots. In the treatment where the plots remained weed-free for first 2 weeks and weedy for the balance 4 weeks leaf fresh weight was reduced by 63%, leaf dry weight by 61%, bulb fresh weight by 48%, bulb dry weight by 48%, root fresh weight by 57%, root dry weight by 61%, number of bulbs by 36%, and diameter of bulbs by 29% compared with that in weed-free plots.

At the final harvest done at 80 DAP in plots that remained weedy-throughout leaf fresh weight was reduced by 76%, leaf dry weight by 74%, bulb fresh weight by 75%, bulb dry weight by 72%, root fresh weight by 72%, root dry weight by 67%, number of bulbs by 40%, bulb diameter by 56%. In plots that remained weedy for the first 2 WAP and weedy thereafter leaf fresh weight was reduced by 66%, leaf dry weight by 63%, bulb fresh weight by 69%, bulb dry weight by 61%, root fresh weight by 65%, root dry weight by 67%, number of bulbs by 24% and diameter of bulbs by 25%. In plots that remained weed-free for the first four weeks and weedy thereafter leaf fresh weight was reduced by 22%, leaf dry weight by 20%, bulb fresh weight by 23%, bulb dry weight by 20%, root fresh weight by 46%, root dryweight by 40%, number of bulbs by 12% and diameter of bulb by 28% compared with that in weed free plots throughout.

In plots that remained weed-free for the first 6 WAP leaf fresh weight was reduced by 13%, leaf dry weight similar, bulb fresh weight by 20%, bulb dry weight

similar (6%), root fresh weight by 17%, root dry weight similar, number of bulbs similar, diameter of bulbs by 25%.

Leaf number declined from 9 weeks after planting in weed-free throughout treatment and this decline was from 8 weeks, 7 weeks, 6 weeks and 5 weeks after planting in plots that remained weed-free for the first 6 weeks, 4 weeks, 2 weeks and in plots that remained weedy throughout respectively.

Length of leaves declined from 8 WAP in weed-free plots and this declined occured from 7 weeks, 6 weeks, 5 weeks and 3 WAP in plots that remained weed-free for the first 6 weeks, 4 weeks, 2 weeks and in plots that remained weedy througout respectively.

With increase in weed free period dry weight of bulbs increased sharply up to a weed-free period of 6 WAP. A weed-free period of 2 WAP increased yield by 1.3 fold, 4 weeks by 2.8 fold, 6 weeks by 3.3 fold and entire duration by 3.6 fold.

The predominant weed species in the experimental plots were Borreria laevis, Cleome viscosa, Dactyloctinium aegyptium, Hedyotis biflora, Oldenlandia biflora and cyperus species. While there was an increase in population of some species, there was also a decline in others with time.

Fresh weight of bulbs declined with increase in total weed density sharply up to a density of 400 weeds/m^2 and thereafter increase in weed density did not affect yield which remained almost static at a low level. A similar relationship was also seen for leaf dry weight vs weed density but

the decline in leaf dry weight was gradual and levelling off of yield occured at the same weed density of 400 weeds/m^2.

In Experiment II dry weight of leaves in plots which remained weedy-throughout was reduced by 76% of that in weed-free plots. Leaf dry weight in plots that remained weedy for first 2 WAP and weed-free thereafter, weedy for first 4 WAP and weedy thereafter, weedy for first 6 WAP and weedy thereafter was reduced by 19%, 52% and 67% respectively.

In plots that remained weedy-throughout dry weight of bulbs and dry weight of roots was reduced by 84%. In plots that remained weedy for first 2 WAP and weedy thereafter, first 4 WAP and weedy thereafter , 6 WAP and weedy thereafter dry weight of bulbs was reduced by 81%, 66% and 20% respectively. For the same treatments reduction in dry weight of roots was by 78%, 52%, and 12% respectively.

Number of bulbs in treatments which remained weedy throughout and weedy for first 2 WAP and weedy thereafter was similar and did not differ significantly. In treatments which remained weedy for first 4 WAP and for first 6 WAP number of bulbs were similar (reduced by 14%). Reduction in number of bulbs brought about in plots that remained weedy for first 4 WAP, first 6 WAP and throughout were similar and did not differ significantly.

In respect of bulb diameter weediness throughout reduced it by 49% and weediness for first 6 weeks by 47%. Weediness for first 2 WAP and first 4 WAP reduced bulb diameter by 17%.

In Experiment III fresh weight and dry weight of leaves was highest in plants which did not receive any potassium

and lowest in plants which received K_2O at the rate of 35.7 kg/ha. Increase in K level did not increase leaf weight.

Dry weight of bulbs were higher in plants which received potassium. Increase in K level increased dry weight of bulbs. Root fresh weight and dry weight were highest in plants which received the highest level (71.5 kg K_2O/ha) of potassium and lowest in plants which did not receive any potassium. Increase in level of potassium increased root weight. Leaf tip scorch was more intense in plants which did not receive any potassium. Degree of scorch was higher in plants which received lower (37.5 kg/ha) level of K. Number of bulbs and diameter of bulbs were not influenced by the level of K.

In Experiment IV fresh and dry weights of leaves were highest in plants which did not receive any potassium. There was no difference in effect due to either levels of K or forms of potassium fertilizer. Increasing level of K increased fresh and dry weight of bulbs. There was no influence of levels of K or forms of potassic fertilizer in fresh or dry weight of bulbs. Fresh and dry weight of roots were lowest in plants which did not receive any potassium. Root weight increased with increase in level of potassium. There was no influence of forms of potassium fertilizer on root weights. Number of leaves per plant, number of bulbs per plant and length of leaves were not affected by level of K or by form of potassic fertilizer. Leaf tip scorch was more pronounced in plants which did not receive any potassium. Form of potassium fertilizer did not influence leaf tip scorch.

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