

Effect of Defoliation on the Yield and Quality of Garlic

م. ثانوی، م. صالحی، م. مهدی پور، غلامعلی پیوست، جمالعلی الفتی

M. Sanavi, M. Salehi, M. Mahdipour, Gh. Peyvast, J.A. Olfati,
University of Guilan, Horticultural Department, Rasht, Iran-Islamic Republic.

Garlic is primarily grown for its cloves used mostly as a food flavoring condiment. But many producers in northern Iran cultivated this crop for its leaves to prepare different local dishes. A study of defoliations (0, 1, 2, and 3 times) on garlic (*Allium sativum* L. 'local variety') during the plant grows was conducted to determine the effect of defoliation on the yield and quality of garlic. Results showed that there were no differences in response for yield reduction, cloves and cormlet by diameter, height, and weight, neck diameter, and dry matter when garlic was defoliated. Defoliation reduced the mean yields by 6, 5.5 and 4.5% in trials 2-4, respectively without significant differences. However Leaves dry matter and plant total weight were affected significantly by treatments. High leaves dry matter was obtained from two times defoliation before cold season (57.75%) and followed by control without any significant differences. Three times defoliation decreased significantly the Garlic total weight and couldn't affect the quality parameters

Introduction

Garlic is primarily grown for its cloves used mostly as a food flavoring condiment. But many producers in northern Iran cultivated this crop for its leaves to prepare different local dishes. Garlic is exposed to different types of defoliation, and this can be affected by natural causes such as hailstorms, wind, insect attack, diseases or by accidental causes such as the incorrect administration of herbicides or damage by farm machinery. These defoliation treatments may reduce the commercial yield, as has been shown with other similar crops such as onion (Muro, et al., 1998). [Baker and Wilcox \(1961\)](#) recorded the highest yield losses for defoliation carried out during the plants' peak vegetative growth stage, before the onset of bulb growth. The objective of this study is to quantify the commercial yield reduction attributable to different defoliation levels undergone throughout the garlic growth cycle.

Material and Methods

The experiment was done at the University of Guilan's Campus Agriculture Faculty in Rasht Iran in 2007. Cormlets was planted in 10 November, at a density of 300-400 g.m⁻². with a distance of 0.45 × 0.10 m between row and plant. Crop husbandry (irrigation, fertilization, weed control, etc.) was according to the methods commonly employed in the region.

For trial, a CRDB design, with four replications was employed. The treatments were included: 1, 2, and 3 times defoliation for using of garlic leaf as an herb. Percentage crop yield loss for each of the three defoliated plots with respect to the control plot was calculated according to Muro *et al.*, (2000). Dates were subjected to ANOVA in SAS. Appropriate means were separated using the Tukey test.

Results and Discussion

Mean separation analysis showed that there were no differences in response for Garlic Diameter, height, weight, cormlet number, height, diameter, and dry matter, neck diameter, and yield reduction. Analyses of variance showed that defoliation did not affect the crop yield. However reduced mean yields by 6.0, 5.5 and 4.5% in trials 2-4, respectively without any significant differences even when the mean yields of the control was 8.68 t/ha. Leaves dry matter and garlic total weight were affected by treatment. High leaves dry matter was obtained from two times defoliation before cold season (57.75%) and followed by control without significant differences. Three times defoliation decreased significantly the garlic total weight but other treatments were unaffected. The stage designated as bulbing by [Mondal et al. \(1986\)](#), which they described as the stage in which bulb diameter was twice that of the neck, is important stage in garlic development. [Bartolo et al. \(1994\)](#) also reported that same stage to be most sensitive to defoliation. It

seems all defoliation in this study was done before this important stage and therefore doesn't have significant effect on yield reduction.

References

- Baker. R.S. and G.E. Wilcox. 1961. Effect of foliage damage and stand reduction on onion yield, paper. 1733, Purdue Univ. Agric. Exp. Sta., Lafayette, In Bartolo, M.E., H.F. Schwartz, and F.C. Scheweissing. 1994. Yield and growth response of onion to simulated storm damage. *Hort. Sci.* 29: 1465-1467.
- Bartolo, M.E., H.F. Schwartz, and F.C. Scheweissing. 1994. Yield and growth response of onion to simulated storm damage. *Hort. Sci.* 29: 1465-1467.
- Mondal, M.F., J.L. Brewster, G.E.L. Morris, and H.A. Butler. 1986. Bulb development in onion (*Allium cepa* L.). I. Effects of plant density and sowing date in field conditions. *Ann. Bot.* 58: 187-192.
- Muro. J., I. Irigoyen and C. Lamsfus. 1998. Effect of defoliation on onion crop. *Sci. Hort.* 77: 1-10.
- Muro. J., I. Ignacio., and C. Lamsfus. 2000. Effect of defoliation on garlic yield. *Sci. Hort.* 86:161-167.