

Effects of Sowing Dates and Nitrogen Application on Phosphorus and Potassium Contents in Parsley

FUNDA YOLDAS*, SAFAK CEYLAN, NILGUN MORDOGAN† and HAKAN CAKICI†
Odemis Technical Training College, Aegean University, 35750 Odemis, Izmir, Turkey
Fax: (90)(232)5444356; Tel: (90)(232)5453572;
E-mail: funda.yoldas@ege.edu.tr; fundayoldas@hotmail.com

The effects of increased N rates (0, 100, 200 and 300 kg N ha⁻¹) on yield, plant length, number of stalk, phosphorus and potassium content in parsley leaf and stalk during seven harvesting at two sowing time were investigated. Nitrogen rates and harvesting times had a significant effect on this criterias. The highest yield, plant length, number of stalk were observed with 100 kg N ha⁻¹ treatment, but maximum P and K content in leaf, stalk were analyzed with 100 kg N ha⁻¹ treatment. In second harvest the highest yield and yield criteria values depend on ecological condition. In both sowing time, P, K content in leaf and K content in stalk were determined more higher in 1st harvest than others significantly ($p < 0.01$). In this research P content in leaf was observed higher than stalk content. In spite of this K content in stalk were higher than leaf.

Key Words: Nitrogen rate, Yield, Phosphorus, Potassium, Parsley.

INTRODUCTION

At the present for maximum production, quality, consciously fertilizer applications have gained importance depending on increasing population. Without soil analyze, unconsciously fertilizer treatment caused yield and quality problems. Parsley is an important vegetable in human nutrition. In 100 g fresh leaves contain protein 2.2 g, fat 0.3 g, carbohydrate 1.3 g, calory 16 and also it contains calcium, iron and high Vitamin A, B and C¹⁻³. Parsley production in Turkey is around 44 000 t⁴, in Odemis, Turkey it is around 40 t in 10 ha area⁵.

There is not much research on fertilization of parsley. So this research has been performed to determine the effects of nitrogen fertilization at the different sowing time of parsley production on yield and some yield properties, P and K content in leaf and stalk.

†Department of Soil Science, Faculty of Agriculture, Aegean University, 35100 Bornova, Izmir, Turkey.

EXPERIMENTAL

This research was conducted at the experimental field of Odemis Technical Training College. Italian variety of parsley was grown in randomized block design with three replications. The plot area was 2 m². The soil characteristics of field are given in Table-1. Fertilizer treatments included four N rates of 0, 100, 200 and 300 kg N ha⁻¹ in two different sowing dates; 27.02.2004 and 27.03.2004.

TABLE-1
SOME PHYSICAL AND CHEMICAL PROPERTIES
OF EXPERIMENTAL SOIL

Characteristics	Value	Characteristics	Unit	Value
pH	7.13	NH ₄ -N	mg kg ⁻¹	11.20
Soluble salt (%)	0.03	Available P	mg kg ⁻¹	13.00
CaCO ₃ (%)	0.33	Available K	mg kg ⁻¹	90.00
Sand (%)	79.44	Available Ca	mg kg ⁻¹	3246.00
Clay (%)	4.56	Available Mg	mg kg ⁻¹	120.00
Loam (%)	16.00	Available Na	mg kg ⁻¹	10.00
Texture (%)	Loamy-sand	Available Fe	mg kg ⁻¹	15.71
Organic M. (%)	1.23	Available Cu	mg kg ⁻¹	1.80
Total N (%)	0.07	Available Zn	mg kg ⁻¹	1.26
NO ₃ -N (mg kg ⁻¹)	9.50	Available Mn	mg kg ⁻¹	10.20

Nitrogen fertilizer was applied in the form of ammonium nitrate, 1/3 at sowing and others 20 d interval as a three division. To all plots, additional 100 kg P₂O₅ ha⁻¹ and 200 kg K₂O ha⁻¹ were applied in the forms of triple super phosphate and potassium sulphate, respectively. The parsley plants were harvested seven time at each of two sowing date. Harvest dates were in first sowing at the 20 May, 20 June, 7 and 21 July, 11 August, 10 September, 9 October; and in the second sowing at the 10 June, 7 and 21 July, 11 August, 10 September, 9 October, 10 November. Common cultural practices were used during the growing season.

In the each harvest stage, yield, length of plant, number of stalk were determined. Parsley leaf and stalk were sampled from each harvest during the 7 harvest time and analyzed for their phosphorus⁶ and potassium amounts⁷. Results were evaluated statistically by Tarist programme⁸.

RESULTS AND DISCUSSION

Yield of parsley, length and stalk number which is the quality criteria resposed significantly to N treatment rates ($p < 0.01$). Maximum values were determined at 100 kg ha^{-1} treatment at the two sowing time also (Figs. 1-3). By this application, 55 and 23 % increases of yield were observed in 1st and 2nd sowing time, respectively compared to controls. Firattekın *et al.*⁹, reported that 100 kg ha^{-1} N treatment was increased parsley yield significantly and also Malakoti¹⁰ stated that highest yield was determined at dose of 100 kg ha^{-1} N.

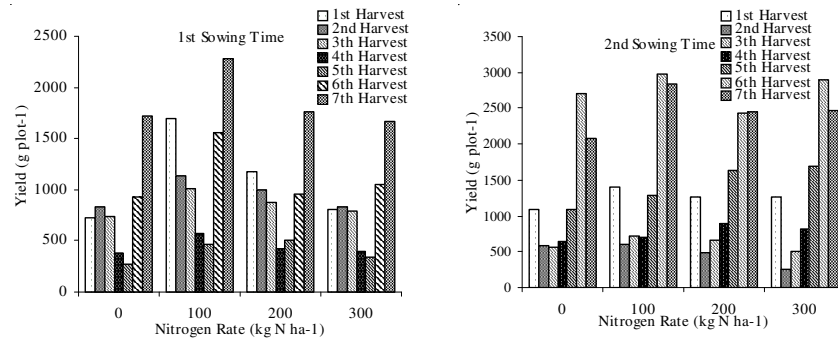
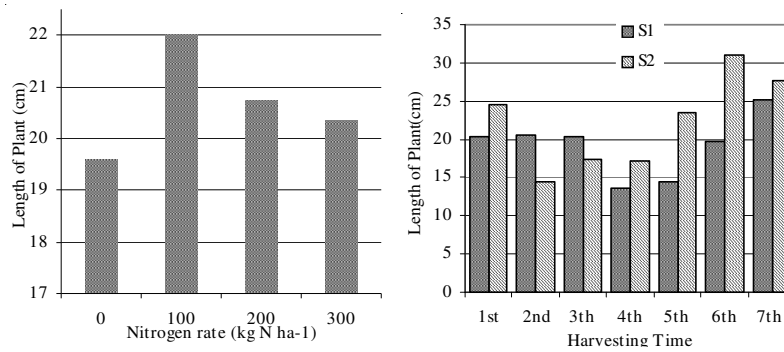


Fig. 1. Effects of nitrogen rates on yield of parsley during 7 harvest at 2 different sowing time

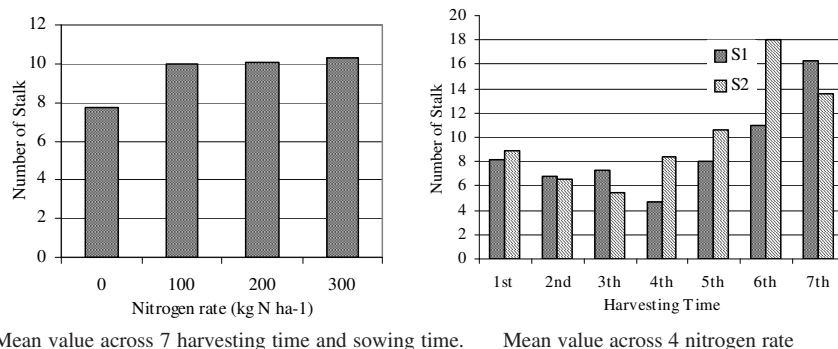


Mean value across 7 harvesting time and sowing time. Mean value across 4 nitrogen rate

Fig. 2. Effects of Nitrogen rates and harvesting times on length of plant

At the same point, Rumpel and Kaniszewski¹¹; Pasikowska *et al.*¹² stated that it was not affected by $50\text{-}120 \text{ kg ha}^{-1}$ N treatments.

Yield and this criterion were effected by harvesting times ($p < 0.01$). The highest values have obtained from 7th harvest in 2nd sowing time (Figs. 1-3).



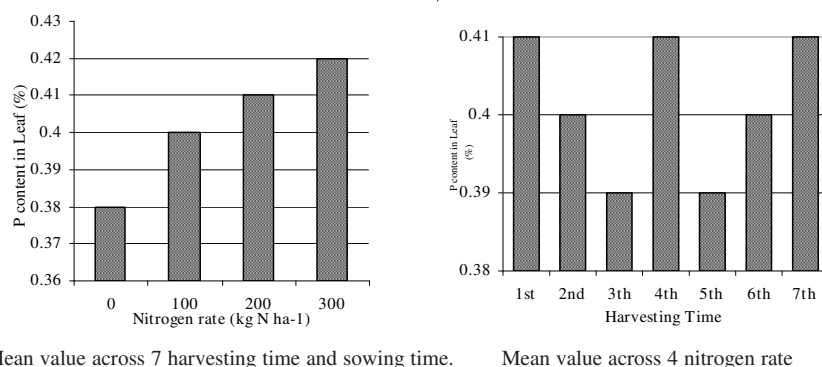
Mean value across 7 harvesting time and sowing time. Mean value across 4 nitrogen rate

Fig. 3. Effects of nitrogen rates and harvesting times on number of stalk

In both sowing date, the highest yield, plant length and number of stalk were observed the same time (10 September). This can be related to ecological conditions. When the temperature was high degree (in July and August) all values were low. This situation can show that physical activities of plants can become slow in high temperatures. Over 35°C temperature and high light density can be slow down grow of parsley¹³.

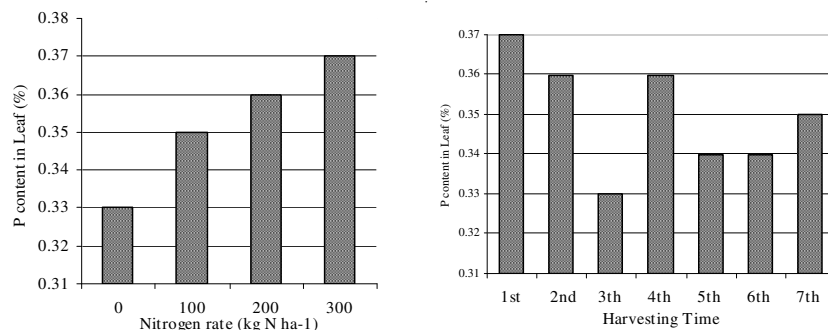
Yield and yield characteristics were affected by sowing time. Generally in second sowing time, the highest values were obtained compared to first sowing time.

P and K content in leaf and stalk are important for nutrition were significantly affected by N doses and harvesting times ($p < 0.01$). The highest values were obtained from 300 kg ha⁻¹ N doses. Similar results were found by Chenard *et al.*¹⁴, they suggest that, P and K amount of parsley leaf were increased by N treatments linearly. In both sowing time, the highest P, K content in leaf and K content in stalk was obtained in 1st harvest and in 2nd sowing time maximum P value in stalk was determined in 7th harvest (Figs. 4-7). Sowing times did not significantly influenced on those characteristics (except P content of leaf).



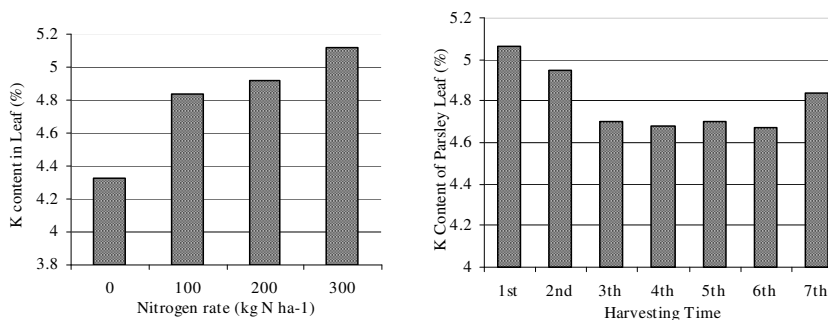
Mean value across 7 harvesting time and sowing time. Mean value across 4 nitrogen rate

Fig. 4. Effects of nitrogen rates and harvesting times on P content of parsley leaf



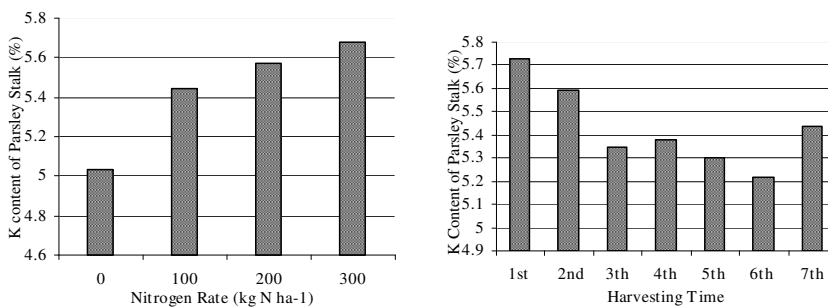
Mean value across 7 harvesting time and sowing time. Mean value across 4 nitrogen rate

Fig. 5. Effects of nitrogen rates and harvesting times on P content of parsley stalk



Mean value across 7 harvesting time and sowing time. Mean value across 4 nitrogen rate

Fig. 6. Effects of nitrogen rates and harvesting times on K content of parsley leaf



Mean value across 7 harvesting time and sowing time. Mean value across 4 nitrogen rate

Fig. 7. Effects of nitrogen rates and harvesting times on K content of parsley stalk

In the study, P content of leaf was higher than stalk, but K content of stalk was higher than leaf.

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