



## Effect of Different Green Manure on Yield of Perennial Wall Rocket

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### Introduction

The rocket is a green leafy vegetable widely spreading in Europe. Its production require large quantities of nitrogen to reach maximum productivity, although high nitrogen availability has often a detrimental effect on the quality of produce, increasing the nitrate content in leaf tissues. The use of the green manures could be an “alternative fertilization method”, alone or in combination with chemical fertilizers and plant-based biostimulants; in addition, green manure can break up pest lifecycles and it can be useful to conserve, accumulate and recycle organic matter and plant nutrients, to improve soil fertility and structure and to assist in the control of weeds, and diseases. The current research has the aim to verify the effect of different typologies of green manure on yield and its components of perennial wall rocket.

### Materials and Methods

- Site** Department of Agricultural Sciences University of Naples Federico II, Portici (NA); plastic greenhouse
- Soil** loam –sand (high content P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, good content OM and total N)
- Crop** perennial wall rocket (*Diplotaxis eruroides* L.) cv. *Reset*
- Transplant** October 8, 2020 with a plant spacing 0.20 x 0.20 m
- Treatments** 4 typologies of green manure (no green manure -**NGM**, and green manure -GM of **Sorghum**, **Crotalaria** and **Mix** of the two crops)  
4 typologies of fertilization (not fertilized –**Control**, mineral nitrogen fertilization –**Min**, application of alfalfa extract and algae *Ascophyllum nodosum* –**Bio1**, and application of legume-derived protein hydrolysate –**Bio2**)  
All treatments were replicated 3 times.
- Plot** 1.4 x 1.4 m
- Harvest** 7 times, starting from November 23, 2020 until May 17, 2021

At each harvest, yield, number of leaves per square meter, and average weight of leaves were determined. The yield is reported as the sum of all harvests, instead, the other parameters are reported as the mean of the seven harvests.

### Results

The total yield of perennial wall rocket was affected both by green manure and typologies of fertilization. The rocket grown on NGM (no green manure) showed the lower value of yield and it was not different from the yield recorded by plants grown on plot with Sorghum-GM (9.2 kg m<sup>-2</sup>); instead, the Crotalaria-GM allowed to reach the highest yield, with a 19.4% increase over Mix-GM (Fig. 1). As expected, the not fertilized control had the lowest yield value (6.8 kg m<sup>-2</sup>), statistically different from the all other fertilization treatments.

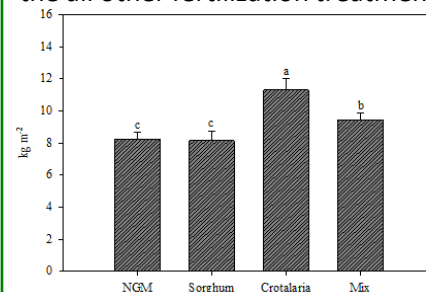


Figure 1. Effect of green manure on total yield of perennial wall rocket

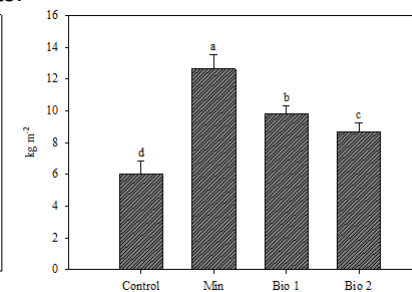


Figure 2. Effect of fertilization typologies on total yield of perennial wall rocket

Table 1. Main effect of greenhouse cover film, nitrogen fertilization and biostimulant application on number, average weight, and dry matter (DM) percentage of leaves of perennial wall rocket (average values of the seven harvests).

Treatments	Leaves		Leaves DM %
	n° m <sup>-2</sup>	g leaf <sup>-1</sup>	
NGM	4839.4 bc	0.26 b	9.1 b
Sorghum	4529.7 c	0.23 c	9.8 a
Crotalaria	5731.7 a	0.28 a	8.5 c
Mix	5306.1 ab	0.26 b	9.0 b
Control	3740.8 d	0.23 b	10.0 a
Min	6115.0 a	0.29 a	8.4 c
Bio1	5557.8 b	0.26 b	9.0 b
Bio2	4993.3 c	0.25 b	9.1 b
<b>Significance</b>			
Green Manure (GM)	**	**	**
Fertilization (F)	**	**	**
GM x F	ns	ns	ns

Regarding the fertilization typologies, Min had the higher number of leaves per square meter and average leaf weight and only for the first parameters, the all other treatments were different between them; finally the Control had the higher value of DM percentage, followed by the two biostimulants, which weren't different between them (Table 1).

### Conclusions

The green manure of Crotalaria assures the best productive performance probably because it is a leguminous crop, then able to fixing nitrogen and become it available for following crops. However, also the green manure of the two mixed crops reached almost satisfying productive results. Finally, the two biostimulants, applied alone, don't allow to have yield similar to mineral fertilization.

Min elicited the higher value of total yield (14.2 kg m<sup>-2</sup>), with a 29% and 45.5% increase over Bio1 and Bio2, respectively (Fig. 2). The number of leaves per square meter showed a trend similar to that of total yield, with NGM and Sorghum which had the lowest values and were not different between them, but NGM was also not different from Mix (Table 1).

The Crotalaria-GM had the significant higher value of number of leaves per square meter and average leaf weight but the statistically lower leaves dry matter percentage (Table 1).