

Barley (*Hordeum vulgare*)

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Barley is a plant which belongs to the genus *Hordeum* of the family *Poaceae* (*Gramineae*). Barley belongs to the group of cereals, which have always been important plants for human consumption. Three species of barley plants are widespread and are grown in some parts of the world, however, only the species *Hordeum vulgare* has of great economic importance. It is assumed that barley comes from the Ethiopian highlands, where it is cultivated in prehistoric times. Barley was the main cereal producing bread for the Jews, Greeks and Romans. In Europe, this plant was an important crop in particular from the Middle Ages mainly in arid areas and on poor soils.



Ecological conditions of growing barley

Barley is not a difficult plant. It is easy for barley to adapt to very different climat conditions, so it is grown in temperate, subtropical and cold climate. The length of the growing season, from sowing to maturity of barley is very diverse and adaptable to climate and other conditions. Drought, as well as other adverse environmental conditions can accelerate the ripening. Barley can grow in adverse conditions, ensuring good harvest and yields, it refers specifically to

extreme conditions in high mountain regions (Tibet) as well as the Saharan belt (North Africa), where these crops sown in autumn, whereas spring seeding is more practiced in continental Europe and North America.

Farming practices and the use of barley

Barley crop has no large claims. It manages almost all soils if they are not skeletal. It is not sensitive to fertilization and it is very resistant to diseases and pests as well as many environmental disadvantages.

Barley is sown in spring or autumn, either manually or via a seeding machine. Reaping comes 3.5-4 months after harvest. Today there are many highly productive varieties of barley and many varieties are resistant to diseases or tolerate difficult environmental conditions of cultivation.

Barley is the main crop of whose grain bread prepared in a number of countries. The grain is rich in carbohydrates, but contains little protein. It is also poor in calcium and phosphorus.

Barley is used for feeding livestock which provides grain and straw. In arid regions of barley, the straw (after harvest and threshing), is used for feeding livestock, mostly sheep and goats. The grain of barley is used in the beverage industry, for the production of whiskey, and even for many other products.

World production and economic importance of barley

Barley is cultivated in more than one hundred countries worldwide. The entire world production reached its peak 1974. Then it is produced 149 million tons, on an area of about 96 million hectares. Since that, the production of barley is constantly falling. According to FAO data, total world production of barley in 2007. amounted to 136 million tons. The largest producer of barley is Russia, in 2007. year produced 15.7 million tons. Followed by Canada, Spain and Germany.

The results of applying Zeogrow on growth, development and

production of barley

1. France, 2005

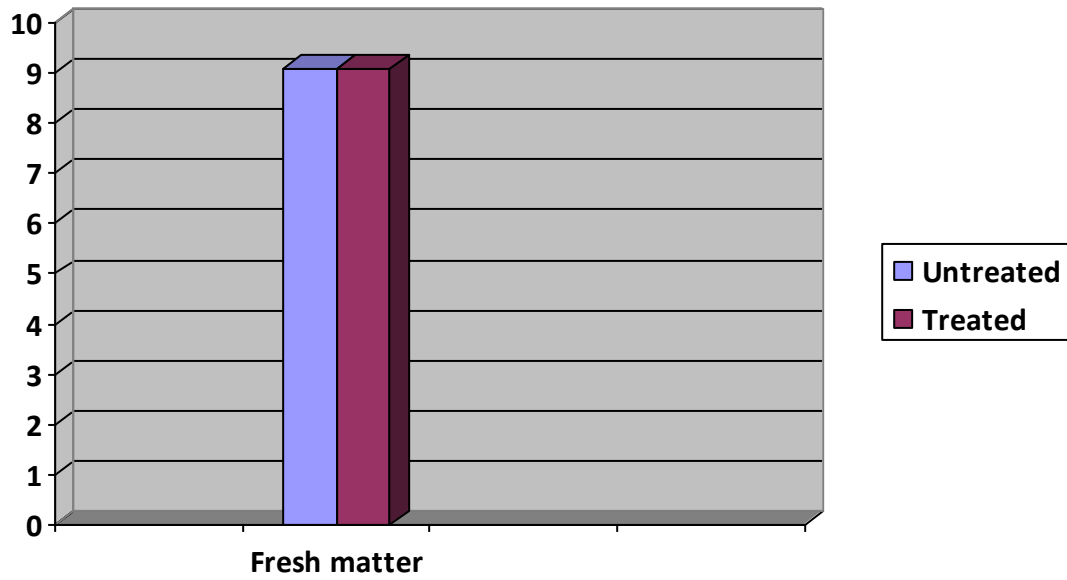
Testing began fertilizing barley with Zeogrow

The experiment was made in a pot with soil, whose nutritional value was recorded. In each experimental container was placed by 25 grains. Zeogrow spraying was done three times. The first spraying was done 2 weeks after germination. Following results were obtained:*

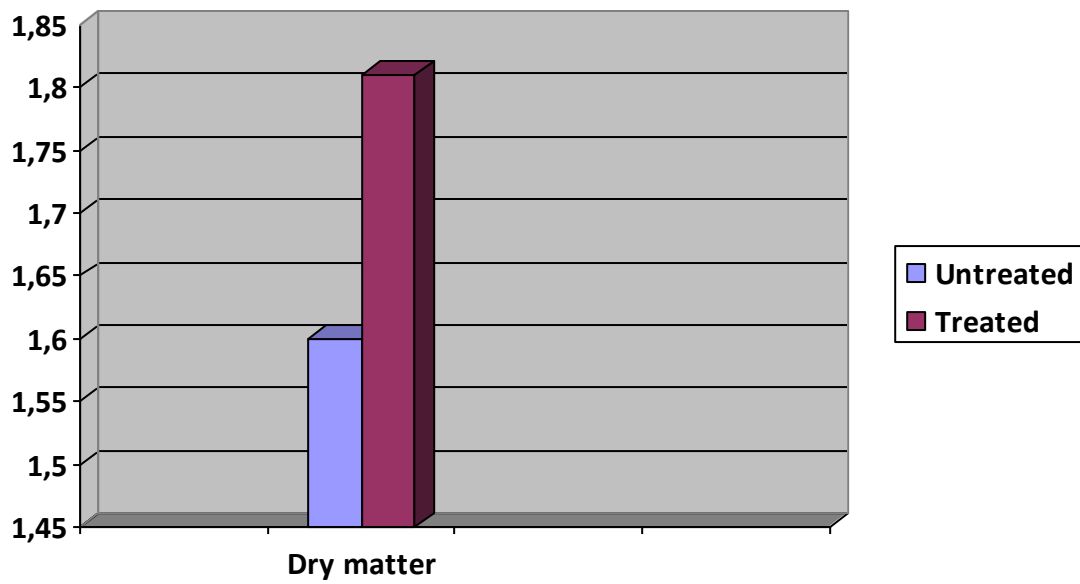
		Plant		RAI		
		Fresh matter	Dry matter	Roots FM	Dry matter ground	RAI
Untreated	1015	9.2	1.71	3.1	6.22	2.01
	1016	9.4	1.56	3.2	5.34	1.67
	1017	8.6	1.54	2.4	5.42	2.26
	Average	9.07	1.60	2.9	5.66	1.98
		0.42	0.09	0.44	0.49	0.30
Treated	1018	9.3	1.91	2.3	4.84	2.10
	1019	8.8	1.8	2.2	4.91	2.23
	1020	9.1	1.72	3.3	7.45	2.26
		9.07	1.81	2.60	5.73	2.20
		0.25	0.10	0.61	1.49	0.08

*(source: French study about Zeogrow, 2006)

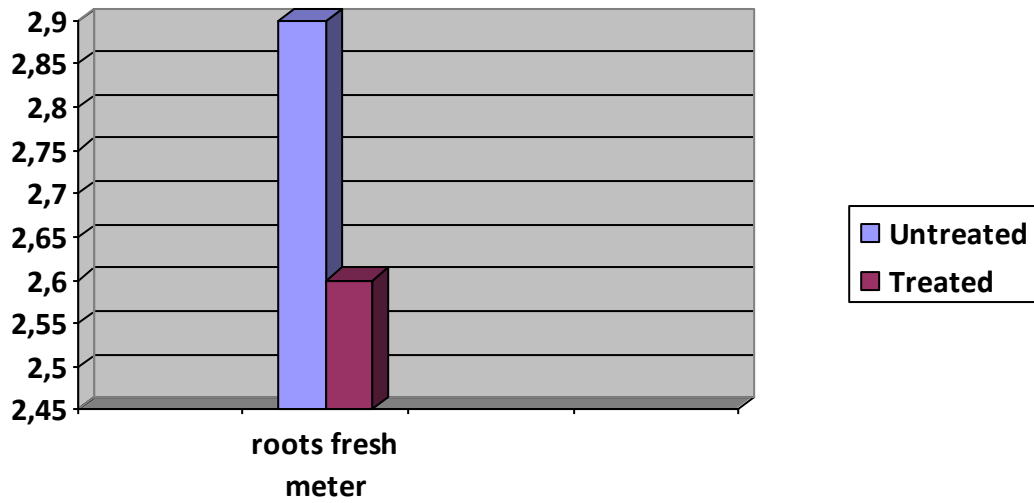
- Rate of fresh weight is the same in treated and control plants: 9.07.



- Rate of dry matter was higher in treated plants (2.90) than in control plants (1.60).

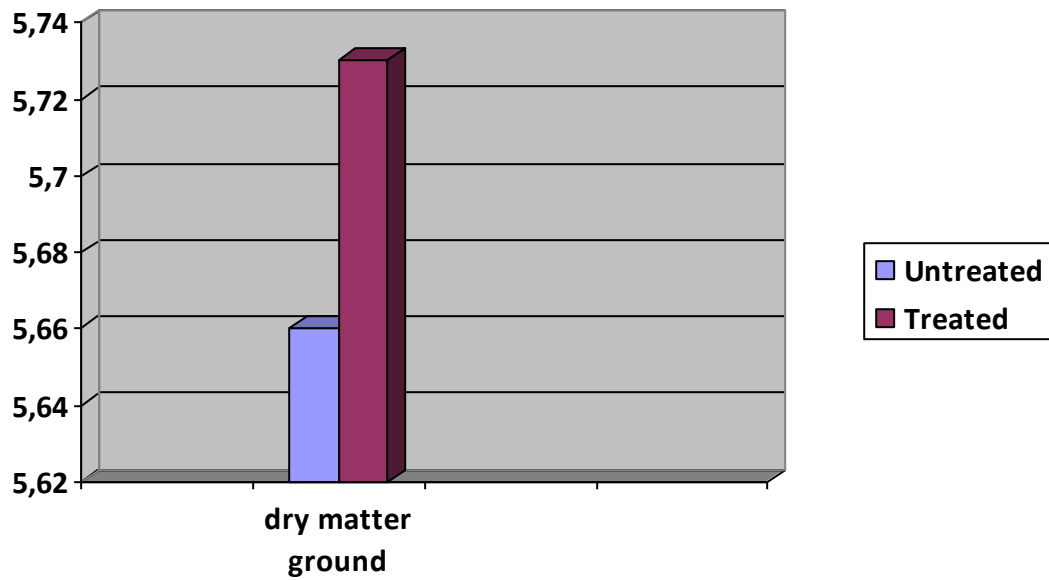


- **Root fresh matter**

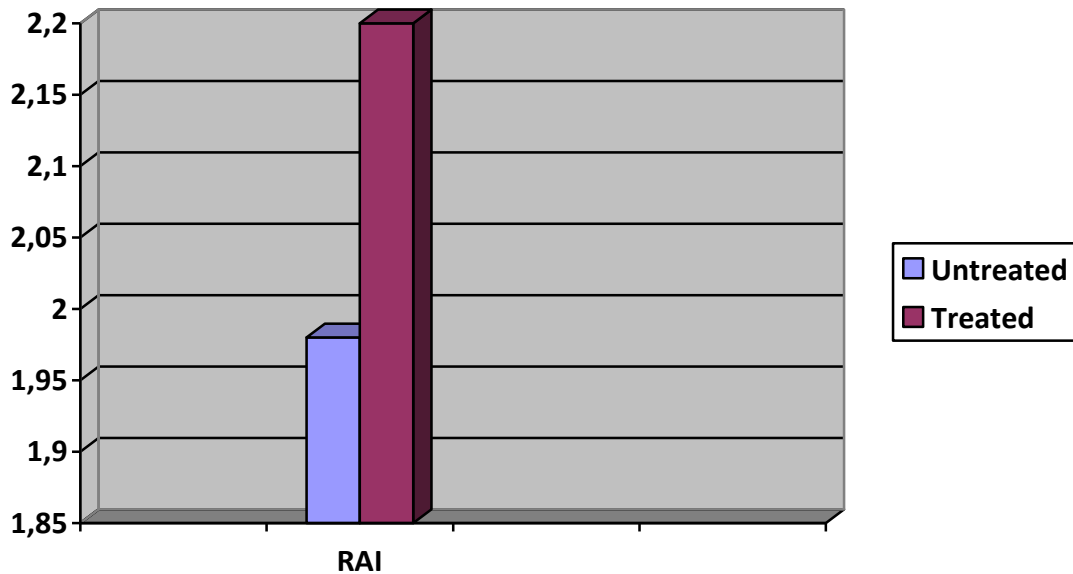


- Zeogrow also increases ground dry matter content so that it makes the plant resistant stronger and healthier.

Average ground dry matter



- Average rhizospheric activity index



2. Germany, 2008

Land owner Gunter Breuer has treated several crops with Zeogrow: corn, potatoes, sugar beets and barley. All these cultures gave excellent results even though the owner made only one treatment.

Barley was sown on an area of 1.5 hectares. Half of this area (0.75 ha) was treated with Zeogrow and the other half was untreated (control). Spraying is done in the early stage of development, when the barley has reached a height 40 to 50cm. Spraying was carried out in the evening, on a cloudy day, no rain and wind.



Figure 1. – On the upper photos we can see two parcels of barley. Picture on the left shows the barley that was once treated with Zeogrow. On the right picture is barley without treatment (control). Photo by D. Dumancic

At the beginning of the harvest, we visited the experimental area and we were convinced of the differences between the treated and untreated plants, which can also be seen on the photos that we enclose here. Differences in yield of barley, unfortunately we have not been available because the owner did not specifically scales treated and untreated barley, however, he made his own assessment and found that the treated barley had 10% higher yield. Grain of barley treated plants was higher and a little more elongated. In appearance and form of grain stalks we have seen the biggest difference. The Number of grains in grain stalks were about 5% higher in treated plants.



Figure 2. – On the pictures above to see ears treated and untreated barley. Photo by D. Dumancic

The owner also noted that the treated barley developed faster and reached a height of about 1.5 meters while the untreated barley was lower by about ten centimeters.

Conclusion

In both experiments described in the treatment of barley in France and Germany, the results of Zeogrow were very positive even though it was an incomplete treatment (only one treatment). Therefore, it is important to emphasize here that the effects of Zeogrow are positive not only when a Zeogrow is used in prescribed amounts, the right way and at intervals that correspond to each culture.

We know that plant can not be harmed even with larger amounts of solution or with increased concentration of the solution, nor with increased number of spraying, because Zeogrow is a completely natural powder that has zero toxicity.