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EFFECT OF ENVIRONMENTAL FACTORS ON CAPSAICINOID CONTENT OF SPICE PEPPER CULTIVARS

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Abstract
In 2018, the weather at the time of sowing and planting was relatively favorable for peppers. Fluctuating temperatures and heavy rainfall, in turn, made the second half of the growing season difficult. The capsaicinoid content of the three studied cultivars shows how well these cultivars perform even under such changing weather conditions.

1. Introduction

Spice pepperis traditionally an indispensable spice of Hungarian cuisine, in addition to its domestic use, it is mainly used by the meat and canning industry to prepare meat dishes and in the manufacture of various condiments, flours, spices, soup powders, soup cubes, sauces, creams, sauces due to its high coloring and seasoning ability [6, 7]. The medical use of pepper also has a long history dating back to the Mayan Indians, who used the plant to treat asthma, coughs, sore throats, various wounds and intestinal complaints. [2]. The genus *Capsicum* (family Solanaceae) included more than 200 varieties.

Capsicums are the only plant species in nature capable of synthesizing a group of compounds. They are the alkaloids that cause the sensation of heat when eaten. Its amount varies depending on the vintage and variety, usually between 3-32 mg/100g, but in some exotic pepper varieties it can reach 600-900 mg/100g. The pungent taste of spice peppers can be attributed not to a single compound, but to vanillamides with a close structure, collectively referred to as capsaicinoids. Their quantity in peppers also depends on genotype, stage of development and developmental conditions. [1].

Capsaicin is mostly found in the veins, so removing it can make a pungent-free grind from the spice pepper variety [7]. In generall, capsaicinoid content is increased under dry conditions. [3].

From a commercial point of view, it is important to determine the degree of pungency, which is currently done by specifying the Scoville Heat Unit (SHU). The Scoville unit expresses the degree of dilution of the pepper extract. The extract is diluted until the pungent taste is no longer felt by the reviewers. A concentration of 1 ppm of capsaicinoids corresponds to 15 Scoville units [4].

The pungency of the peppers ranges from 0 Scoville units of non-pungent varieties to 300000 of Habanero, considered one of the most pungent pepper. The Scoville unit of the currently strongest pepper, Naga Jolokia, in excess of 1 000 000. The Scoville unit of pure capsaicin is 15 000 000 [8].

The pharmacological action of capsaicin is very wide. Folk medicine has long considered spice peppers to be an elixir, and its chewing has alleviated the pain caused by muscle and joint,

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shingles, as well as toothache. It has also been used to prevent cardiovascular disease and as a bactericide and anthelmintic. Due to their blood circulation enhancing effect, pepper mask is also suitable for the treatment of cellulite and it has anti-wrinkle effect [5].

In my experiment, I examined the capsaicinoid content of the spice pepper cultivars in the highly variable year of 2018.

2. Matherials and methods

2.1. Weather condition

In 2018, the weather at the time of sowing and planting was relatively favorable for peppers. There was a very strong aphid invasion in the spring, as a result of which cucumber mosaic virus infection was also significant. In June, a very significant amount of precipitation (Fig. 1.), the temperature was also lower than in previous years, so the climate was optimal for the infection of the bacterium Xanthomonas.

The higher rainfall in June also limited the nutrient supply of the plants, and the higher nutrient demand during flowering could not be met. Due to the weather, the growth of peppers was not optimal, it turned in the generative direction relatively quickly and the height of the plants did not reach the level of previous years. At the beginning of the harvest, we predicted a significant yield loss. At the end of September, a strong cooling (Fig. 2.), ground frosts locally endangered the pepper plantations, fortunately this did not cause significant crop loss.

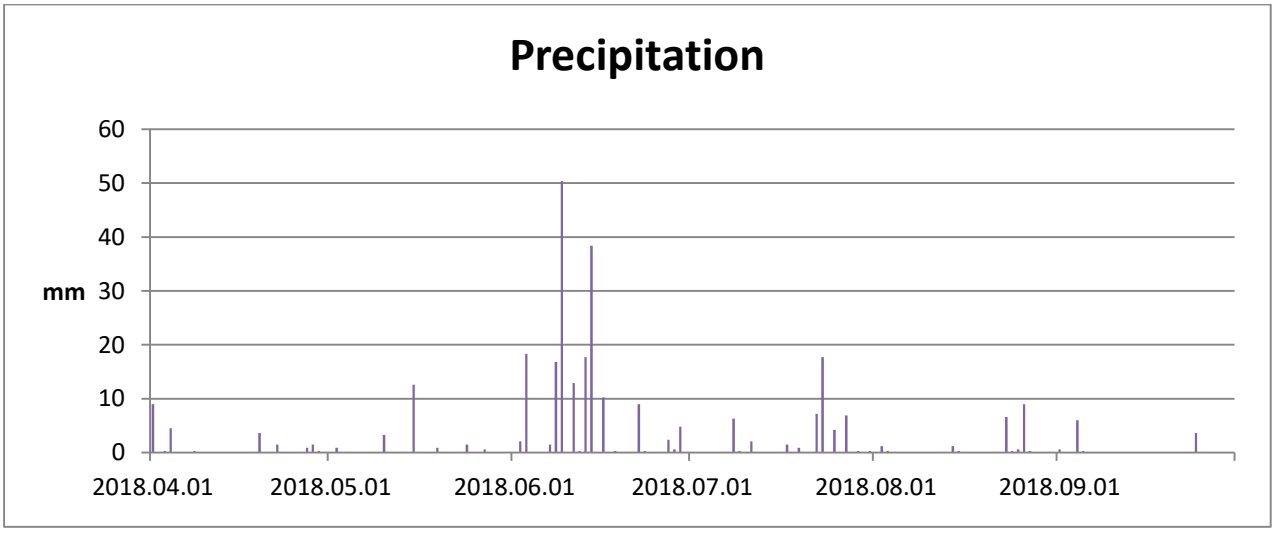

Figure 1. Precipitation data of the sample field

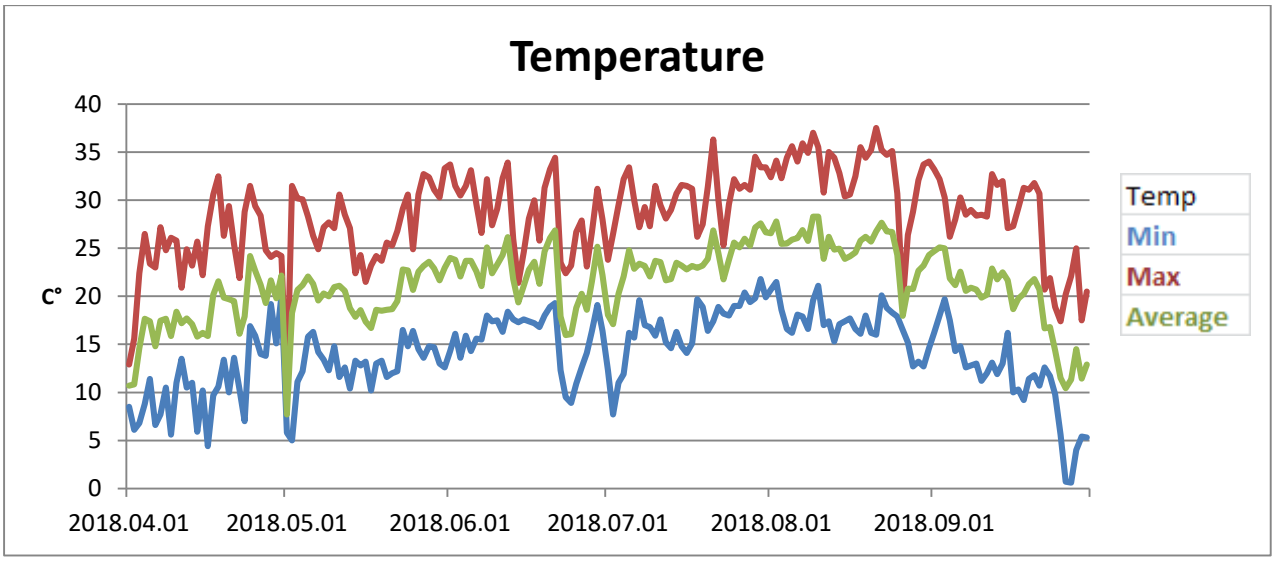

Figure 2. Temperature data of the sample field

2.2. Plant material

Seeding took place on the 21rd of March, and harvest on the 24th of August. The varieties used in the experiment were: Hetényi Parázs, Unikal, Unihot. The planting was on 18 May 2018 with the following densities:

Hetényi Parázs with 173 000 (173ED) (260 thousand plant/ha), Unikal with 230 000 (230ED) (320 thousand plant/ha) and Unihot with 360 000 (360ED) plant/ha. Due to higher rainfall in June, pepper growth was not optimal. During harvest, only biologically ripe berries were harvested. A sample weighing 1 kg was taken from each replicate. After picking, we counted the number of berries in one kilogram of sample. After all measured data were recorded, the samples were dried under cover for 40 days. The capsaicinoid content of the cultivars was then measured (Fig. 3.).

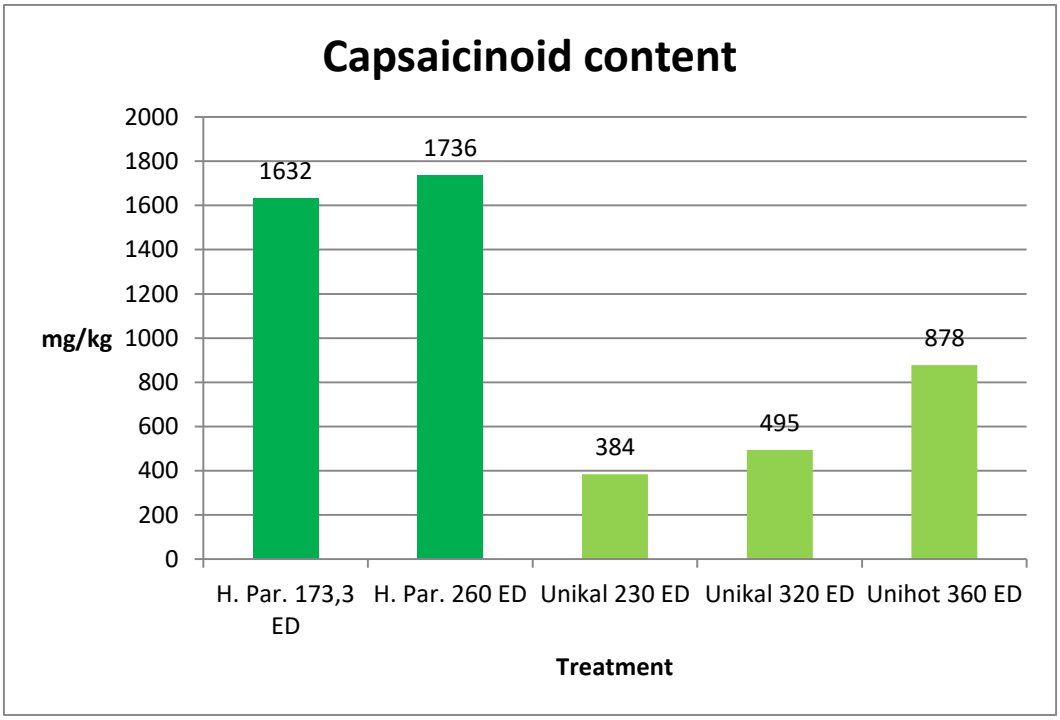

Figure 3. Capsaicinoid content of pepper varieties

3. Results

Based on Figure 3., it can be well observed that Hetényi Parázs has the highest capsaicinoid content thanks to the good weather. Capsaicinoid content was measured at 1632 mg/kg for 173ED and 1736 mg/kg for 260ED. These differences are almost negligible. In the case of Unikal, a capsaicinoid content of 384 mg/kg was obtained in the 230ED density plantation and 495 mg/kg in the 320ED density plantation. In the case of this cultivar, it can be said that the alkaloid content may have developed low during the summer due to the constantly changing weather. Unihot 360ED showed a capsaicinoid content of 878 mg/kg at a plantation density. The good weather, and the

4. Conclusions

It can be said that the content of capsaicinoids of all three cultivars we studied corresponded to the values expected under intensive conditions. Due to the varietal characteristics of Hetényi Parázs, it produced higher results. The growth of Unikal was suboptimal, so its alkaloid content also became lower by the end of the growing season.

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