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## 1. Introduction

Pepper (*C. annuum* L.) is one of the major vegetable species in Serbia. Fruit characterization is the first step in the description and classification of pepper germplasm for breeding purpose. The application of appropriate statistical methods is a useful tool for the description and genotype classification in breeding programs (Jankulovska *et al.*, 2014). Significant positive correlation between the morphological traits and AFLP markers indicated that the difference in AFLP distances tend to reflect the morphological differences. Therefore, the genotypes can easily be distinguished using only phenotypic traits (Geleta *et al.*, 2005). The aim of this research was to characterize pepper varieties for main fruit traits visually and to find relationship between traits and varieties.

## 2. Methods

Sixteen pepper genotypes from the Institute of Field and Vegetable Crops assortment were evaluated. The following quantitative traits were analyzed: fruit weight, fruit length, fruit diameter, fruit index, locule number, number of apices, and pericarp thickness. Also fruit color before maturity, fruit color at maturity, fruit shape in longitudinal section, fruit attitude and presence of capsaicin in placenta were noted according to UPOV Test Guidelines (2006). Software package Statistica for Windows ver. 12, was used for Principal Component Analysis (PCA) to evaluate the level of diversity for pepper varieties and to rank the contribution of the variables.

## 3. Results

The most important positive traits in first PC (principal component) are: fruit index, fruit shape in longitudinal section, and capsaicin in placenta, while the negative are: fruit diameter, fruit weight, pericarp thickness and number of apices (Figure 1). A great relationship is established in PCA between the major fruit characteristics: fruit weight, pericarp thickness and fruit diameter. Fruit attitude is in the great dependence on the fruit length (shorter fruits are usually upright). The number of apices is highly dependent on the locule number, and the pungency is related to the fruit index.

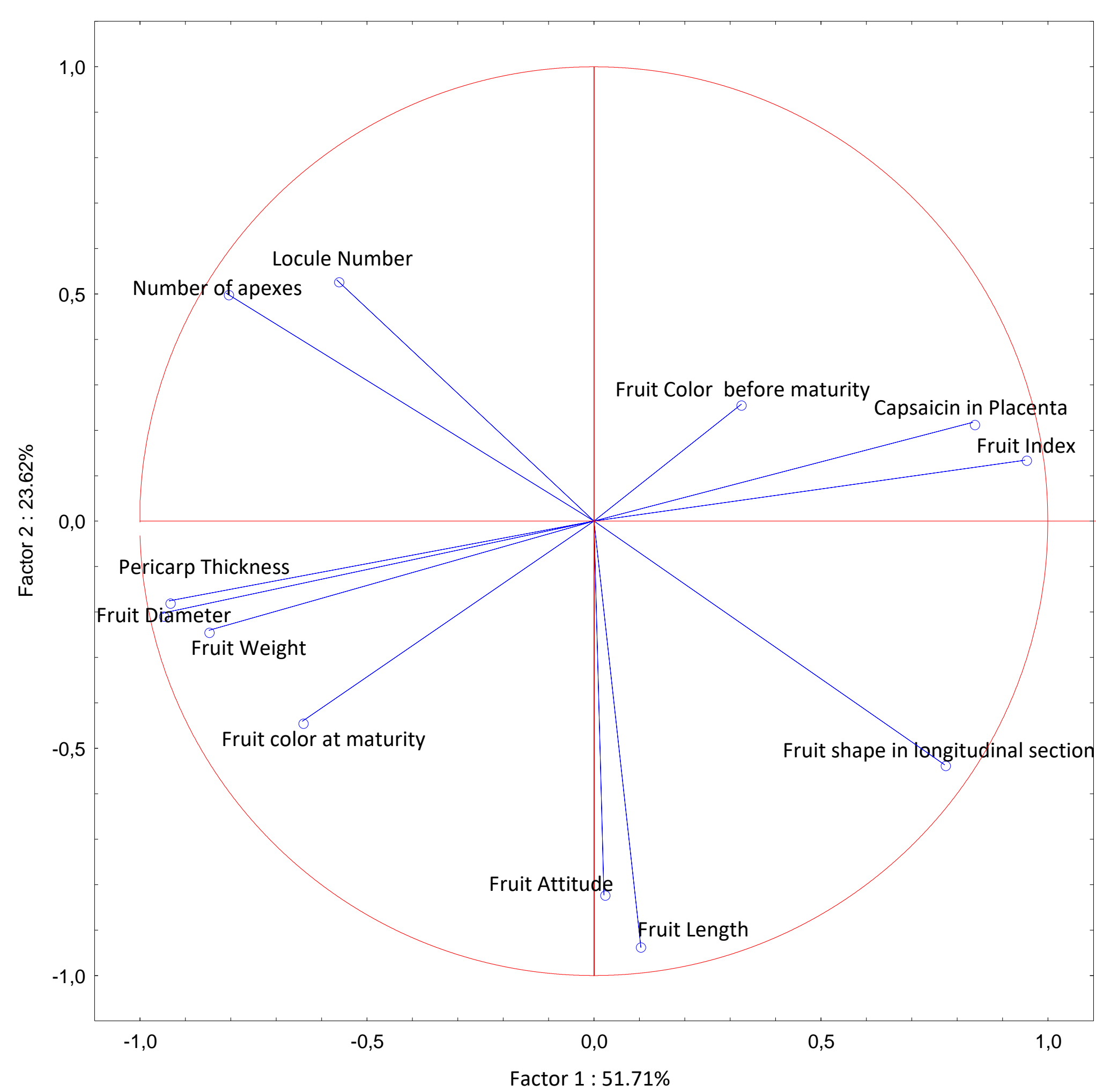


Figure 1. Biplot of the evaluated pepper fruit traits based on first two PC

Based on PCA analysis, pepper varieties have been grouped according to the fruit characteristics (Figure 2 and 3). In the first quadrant are varieties: Crvena feferona, Žuta feferona and the new NS Vatreana. All varieties belong to small hot peperoni type with upright fruits, while the largest differences are at color maturity. Bell peppers and Novosađanka (tomato shaped pepper) are represented in the second quadrant. In the lower part of biplot are kapija type varieties (Amfora, Una and Kurtovska kapija), as well as shipka type (Plamena). Varieties with upright fruit position and conical shape (Matica and Somborka) are located in the center of biplot.

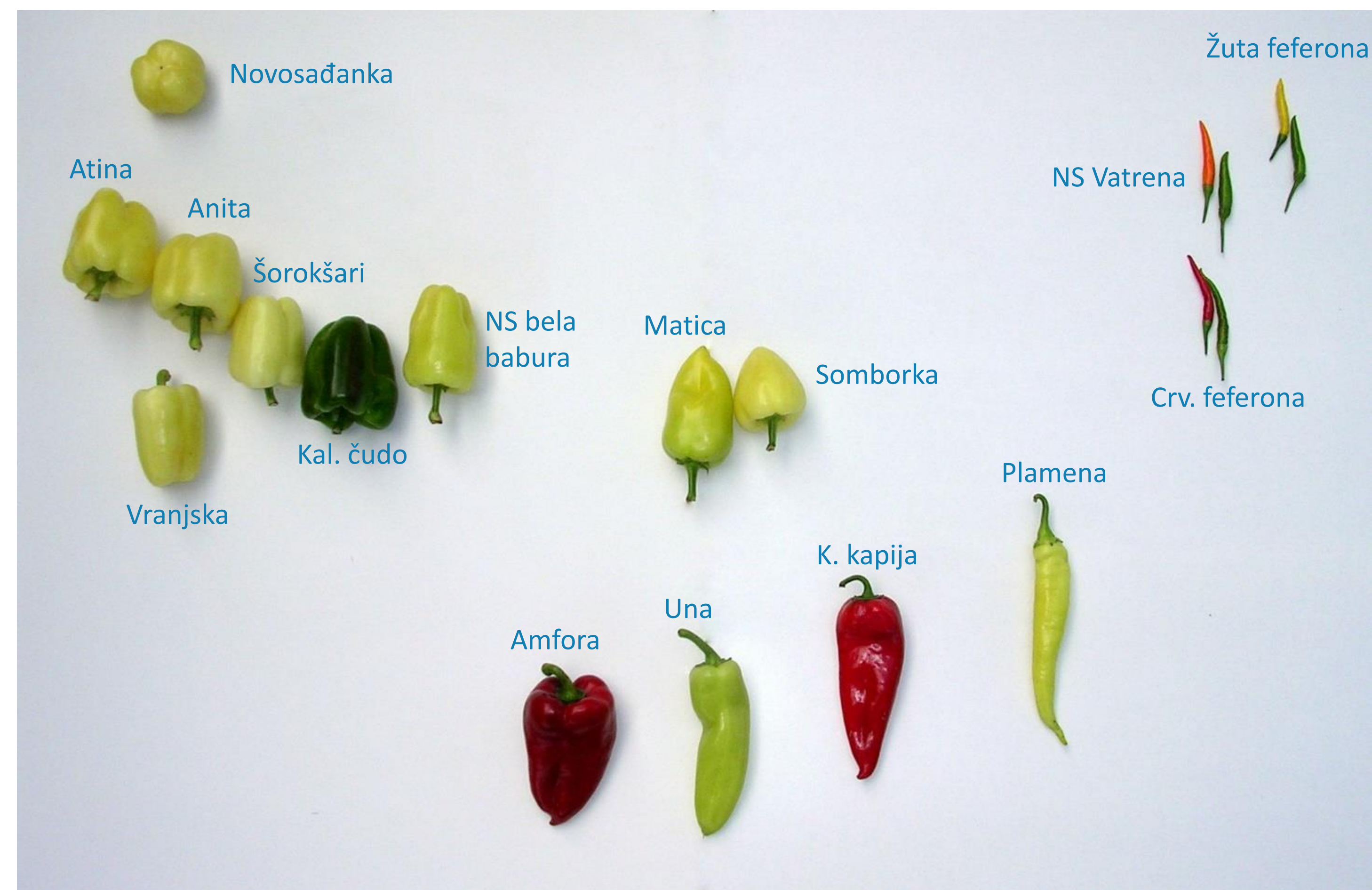


Figure 2. Position of the pepper varieties according to PCA

## 4. Conclusion

Evaluated varieties from the Institute of Field and Vegetable Crops assortment show significant differences. The largest group of varieties consists of bell peppers but they show very similar characteristics. Combining the most important fruit traits for PCA and pictures of fruits is appropriate method for good visual presentation of different pepper varieties. This type of visual fruits presentation is effective for students to see better fruit similarity and divergence between pepper genotypes.

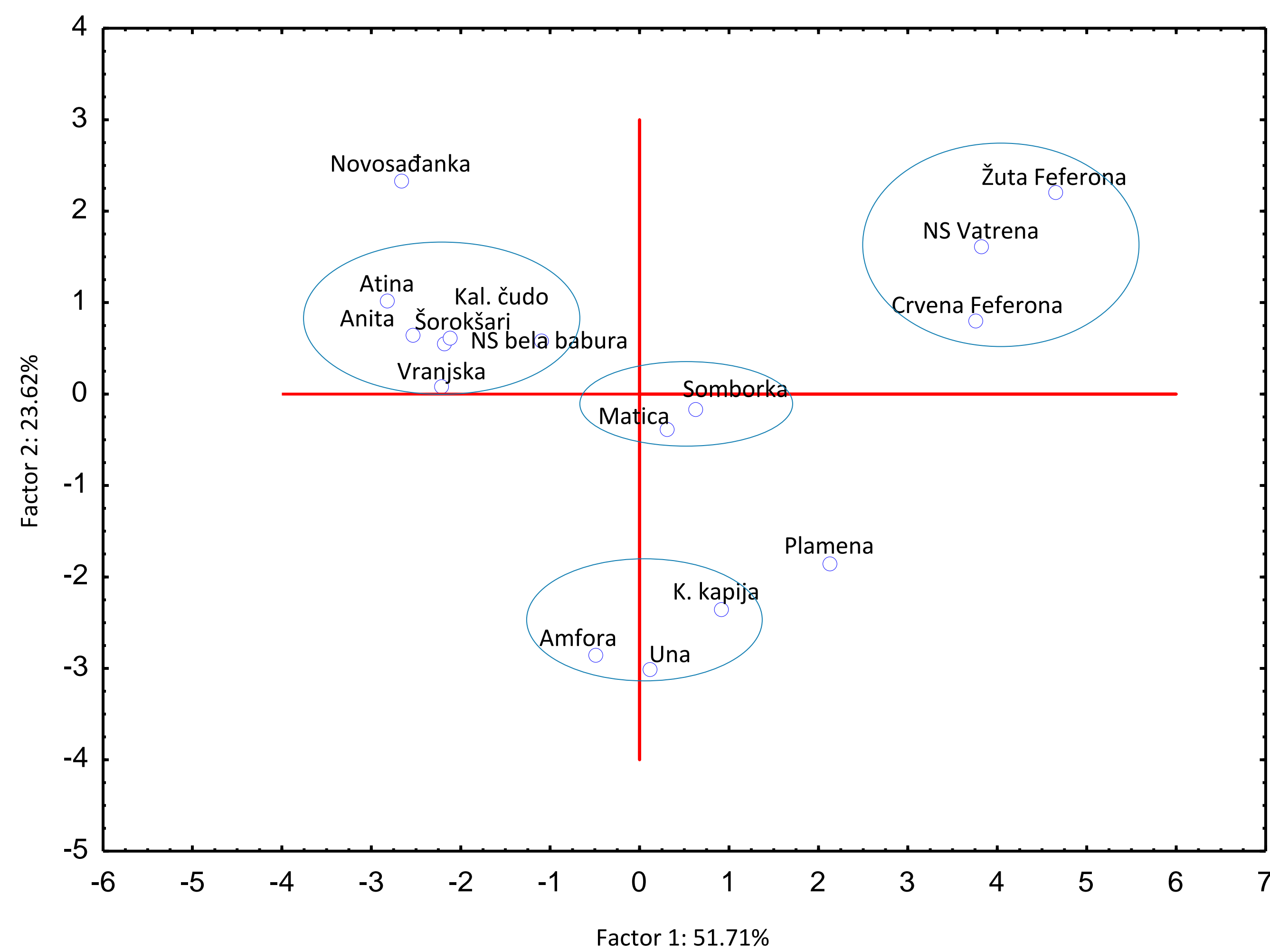


Figure 3. Biplot of evaluated pepper varieties based on the first two PC

## 5. References

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