STRENGTHS AND LIMITATIONS OF MEGA-ENVIRONMENT IDENTIFICATION USING GGE BIPLOTS MODEL

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Mega-environment identification is an important practice that can have a significant value to the optimal allocation of resources during the cultivar selection process, as well as to the reduction of cultivar selection cost and to better cultivar positioning. In this study thirty six varieties were tested for seven years (1999-2005) in four significant sub-regions of Greece. The data was analyzed by the GGE Biplots model in order to identify the cultivar x environment interactions. Yearly biplots allowed the identification of the winner cultivars and the grouping of environments with the minimal interaction within. Among the results the most significant were the following: In the whole period of the years in study Thessaly and Macedonia were grouped together and this can be considered as these two locations can make a megaenvironment. The sub-region of Sterea was also grouped together with them in six out of the seven years which means that it can be a part of this mega-environment, but it needs to be approved with more data in the future. The sub-region of Thrace was not grouped with any of the other sub-regions in any year and it can be considered as a separate mega-environment. Additionally, the above results were confirmed with the Euclidean distance and Pearson correlation. The GGE biplots can offer the utility of grouping the environments but under certain limitations. The most important limitation is that the grouping is strongly affected by the winner cultivar. Usually strong cultivars give small number of mega-environments which makes the cultivars with specific adaptability to be under question if the can introduce into the biplot a new mega-environment. For this reason it is proposed the removal of the winner variety in order to give the chance to other varieties to express their superiority (because of their good adaptability in specific sub-regions microenvironments). It is to mention that in works on plant selection it should always be taken into consideration the known weaknesses of the agricultural experimentation, e.g. the effects of the number of trials and the experimental error.