Adaptability and Stability Analysis of Common Wheat Production

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Abstract. Wheat is one of the most produced cereals in the world and is used in the manufacture of various products that are consumed daily. As a result, there is a need to produce quality wheat in various regions of the world, to meet the demand and reduce transportation costs. It is a versatile crop, all over the world, with a wide number of cultivars adapted to local conditions. This work had the objectives of comparing the values of the genotype-environment interaction (GE) obtained using the additive main effects and multiplicative interaction model (AMMI) and in the analysis of the linear regression (LR) and comparing the production stability of common wheat genotypes. Eleven genotypes were evaluated in different environments (combinations of location and year) based on the data analysis obtained in field trials that took place in the period from 2015 to 2019. The experimental design used was randomized blocks, with two repetitions. The sum of squares (SS) of the regressions only explained 21.6% of the SS of the GE interaction, while the first component (PC1) of the analysis of the main components explained 46.3%. The SS of PC1 was twice greater than the SS of all combined regressions (joint, genotypic and environmental). Therefore, the AMMI analysis was more efficient in describing the GE interaction than the LR.

INTRODUCTION

In plant breading, the aim is to obtain varieties that can be used in as wide areas as possible. Thus, cultivar comparison trials (cultivated varieties) tend to be integrated into networks. Given their robustness, the individual trials of these networks are often of the randomized block type. In fact, in the case of cereals, the *Cymmit* protocol indicates the use of tests of this type with four blocks, comparing eleven varieties at a time. This protocol easily allows for the standardization of results obtained in different countries.

In Portugal, the genetic improvement of wheat from the National Institute of Agrarian and Veterinary Research (INIAV) has been developing, since 2011, a line of phenotyping with varieties of soft and durum wheat, in collaboration with Arvalis (Institut du Végétal, France). The new varieties of common wheat have a high productive potential, high technological quality and even resistance to the main diseases and pests, which may create value in the grain sector in Portugal.