



A COMPARATIVE STUDY OF SOME *Aegilops* L. (*Poaceae*) COLLECTED AT DIFFERENT REGIONS OF ALBANIA

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SYNOPSIS

Key words:

Aegilops, genetic improvement, morphological and physiological parameters, wheat.

The plant materials used in this study consist in 24 accessions of *Aegilops* collected in different regions of Albania. The studied parameters include morphological, physiological and production ones like germination duration, plant height, the type of coleoptiles, type of tillering, ear characteristics etc. The results showed that the *Aegilops* accessions collected in different parts of Albania are characterized of a wide variability. These data and other useful traits in *Aegilops* could be identified and used in wheat breeding programs.

INTRODUCTION

Wheat (*Triticum aestivum* L.) due to its physiological characteristics that adapt its cultivars for production in a wide range of eco-geographical conditions is the most widely grown plant in the world. Wheat grain is used for many different food products. It is the main food for about 35% of the world's population, and is becoming increasingly important in the developing world (Cimmyt, 2003). Genetic erosion caused by modern cultivation procedure has narrowed the genetic base of many crops, including bread wheat. To meet the demand for developing high yielding and stress-resistant wheat cultivars, it is desirable to increase the genetic base of this crop (Arzani et al., 2005). The wild relatives of bread wheat, *T. aestivum* L., are considered as potential sources of useful alleles for bread-wheat improvement. The genus *Aegilops* L. and *Triticum* L. have contributed two of the three (B and D) and one of the three (A) bread wheat genomes, respectively, (Lage et al., 2003). The genus *Aegilops* contains 22 species comprising both diploids and polyploids that originated from center of origin (van Slageren, 1994). The study of genetic diversity of the genetic resources of *Aegilops* may provide significant information regarding their potential for wheat breeding. Wild relatives and related

species can be successfully crossed with bread wheat. During recombinations, most of undesirable gene linkages can be broken by repeated backcrossing to cultivated wheat. On the other side, amphiploids from interspecific crosses between tetraploid wheat and *Aegilops* species, as their close relatives, are useful bridging germplasm for introduction of desirable alien characters to bread wheats (Friebe et al., 1996). Comparative study of microsatellite diversity in wheat germplasm among a wide range of world areas indicated that the greatest genetic diversity originated from Iran (Cubero J., 1993), (Dvorak et al., 1998). *Aegilops* represent a large reservoir of useful characteristics that can be exploited for wheat improvement. Many agronomically interesting characteristics, comprising resistance to biotic and abiotic stresses has been transferred from these species to wheat (Friebe et al., 1996). Traditionally, germplasm has been characterized based on agronomic and morphological studies, but recently use of molecular markers to study diversity of crop species has become common. DNA markers have the advantage of directly detecting sequence variation among cultivars. The primary objective of recent studies is to understand the extent and pattern of genetic diversity among diploid and polyploid wild species of wheat and to compare with those of using morphological traits.

MATERIALS AND METHODS

The experimental probe was performed at Agricultural University of Tirana (AUT), Botanical Garden. The plant material consists in 24 accessions of *Aegilops* collected in 24 different parts of Albania during the expeditions, performed as part of a project of biodiversity identification and conservation (Tab.1).

No.	Name	No.	Name
1	Ardenica 5	13	Patos 5/12
2	Divjakë 5/1	14	Peshkëpi 5/13
3	Pojan 5/2	15	Barmash 227
4	Patos 5/3	16	Drenovë 228
5	Borsh 5/4	17	Qafë thanë 229
6	Lukovë 5/5	18	Xibrakë 230
7	Bistricë 5/6	19	Elb. (perif) 163
8	Zhiton 5/7	20	Shushicë El. 160
9	Terpan 5/8	21	Qafë Krrabë 161
10	Tomorr 5/9	22	Gjinas El 162
11	Bargullas 5/10	23	Rrazë- Krujë 164
12	Ardenicë 5/11	24	Priskë 165

Table 1: The 24 *Aegilops* accessions named according the regions where are collected.



Figure 1: The administrative map of Albania.

The morphological and physiological parameters evaluated are as below:

- germination duration as the number of days from sowing till emerge
- Coleoptiles type
- Tillering form
- Plant height
- Leaf pigmentation
- The spike characteristics
- Grain size and weight

RESULTS AND DISCUSSIONS

The data processing of the morphological and physiological parameters show relatively wide variations exist among 24 *Aegilops* accessions evaluated. The Figure

2 show *Aegilops* plants *in situ* at Barmash region in the south Albania. The Figure 3 show a view of *Aegilops* plants from the AUT Botanic Garden.



Figure 2: *In situ* plants of *Aegilops* at region of Barmash.



Figure 3: A view of *Aegilops* plant ears from AUT Botanic Garden.

The germination duration (in number of days) of 24 accessions of *Aegilops* showed significant variations (Figure 4).

The tillering form varied from middle to very frequently one. The plants grow up right and semi lied and missed full lied plants.

A considerable variation was proved for plant height, at every phenological phase of plant life cycle (Figure 5).

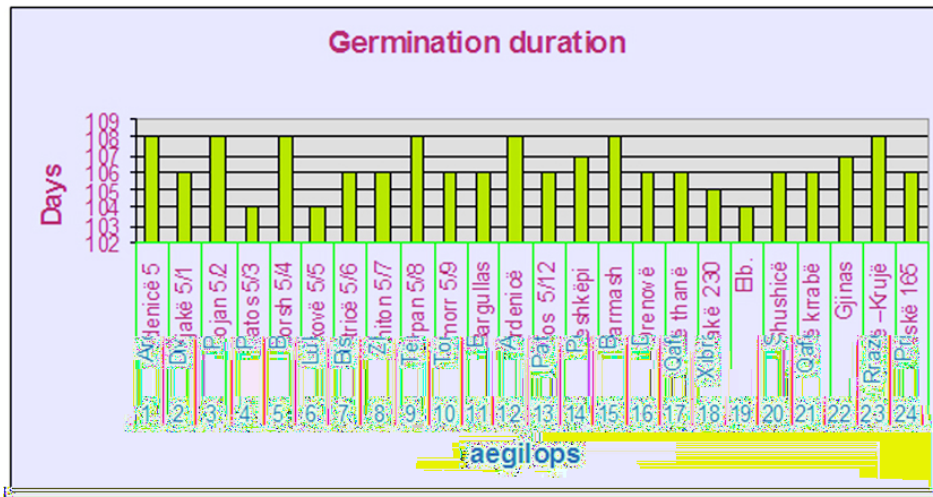


Figure 4: The germination duration (in number of days) of 24 accessions of *Aegilops* collected in different parts of Albania.

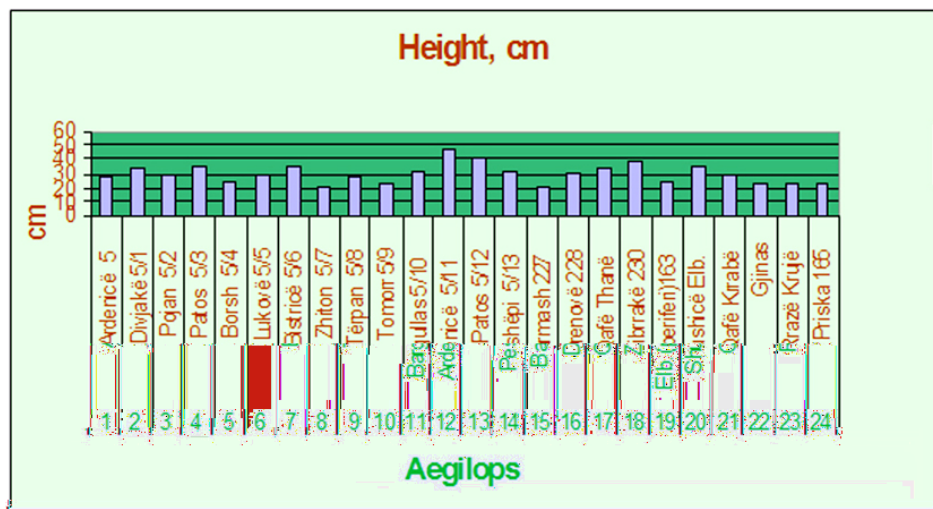


Figure 5: The average plant height of 24 accessions of *Aegilops* collected in different parts of Albania.

Significative variations proved for plant leaf pigmentation, too.

Some very interesting data are that related spike components characteristics, where are included ear number per plant, ear length, the number of grains per ear, grain length and grain weight (Figures 6, 7,8,9,10).



Figure 6: The photographed ears of 24 accessions of *Aegilops* collected in different parts of Albania.

Average ear length

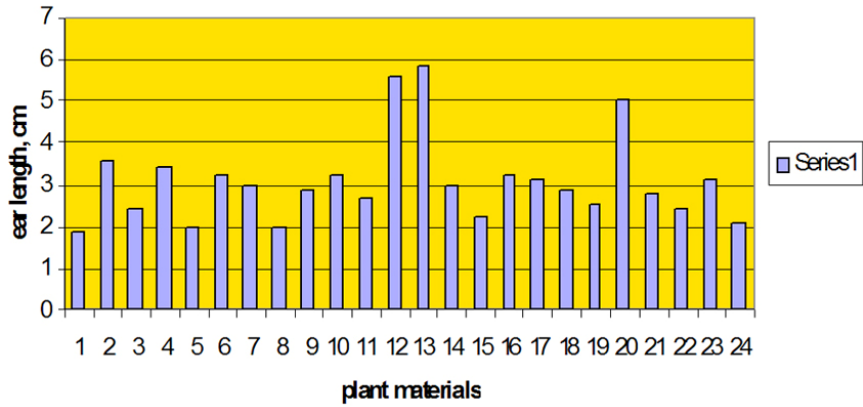


Figure 7: The average ear length in 24 accessions of *Aegilops* collected in different parts of Albania.

Average number of grains per ear

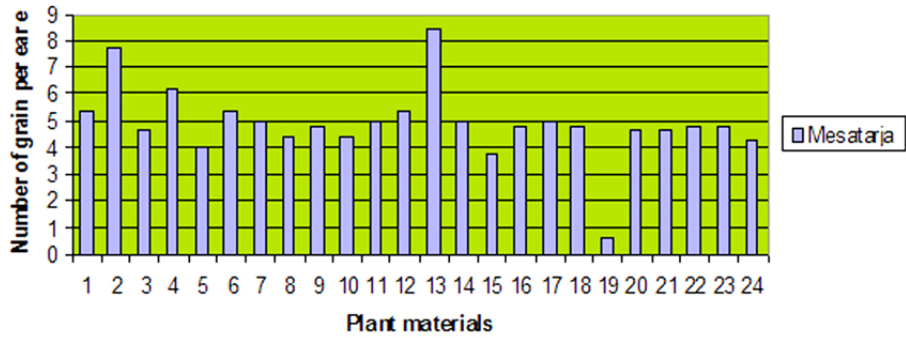


Figure 8: The average number of grains per ear in 24 accessions of *Aegilops* collected in different parts of Albania.

Average grain length

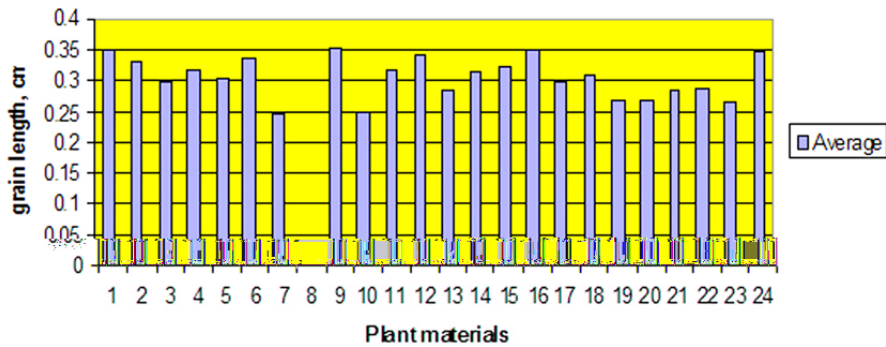


Figure 9: The average grain length (cm) in 24 accessions of *Aegilops* collected in different parts of Albania.

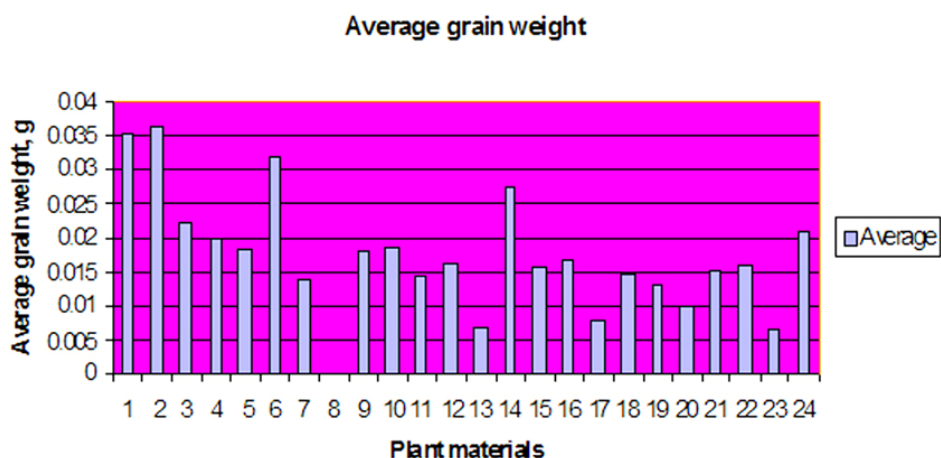


Figure 10: The average grain weight (g) in 24 accessions of *Aegilops* collected in different parts of Albania.

The variance analysis show that, almost, for all parameters mentioned above the founded differences are statistically verified.

CONCLUSIONS

Based on the results of data processing could be concluded that the *Aegilops* collected in different regions of Albania are characterized of a wide variation of their morphological and physiological traits.

These results could become a very useful material as a source for more deep genetic and molecular studies of *Aegilops* accessions collected.

Some of morphological parameters especially that of growth form and spike components could be use in the soft and hard wheat breeding programs.

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