

Sicilian Durum Wheat Landraces for Production of Traditional Breads

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Figure 1 – Spikes of “Timilia” landrace

A large number of durum wheat landraces were grown in Sicily, in the first half of the last century, because of their suitability to environmental conditions of Mediterranean areas. Because of their high adaptability and their particular qualitative characteristics, some landraces, such as “Timilia” (Fig. 1), are till now cultivated in little areas of Sicily and used to produce typical local bread (Fig. 2).

Whole grain flour of “Timilia” is used for the preparation of the handmade bread from Castelvetro (Pane Nero di Castelvetro) (Fig. 3), widely diffused in the western area of Sicily. Principal characteristic of this typical Sicilian bread is the dark colour of breadcrumb and the sweet taste.

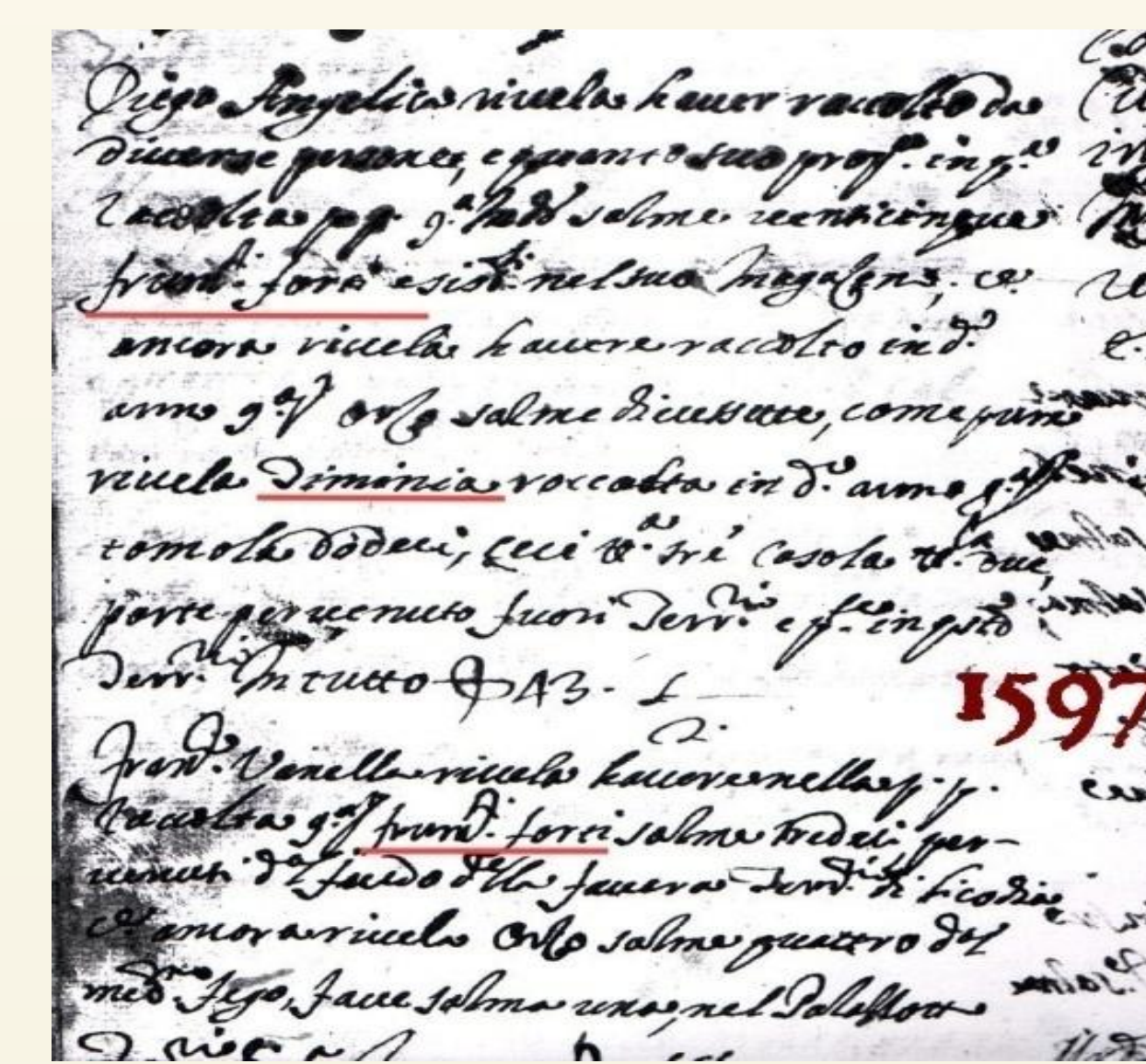


Figure 2 – Antique manuscript that describes the use of “Timilia” in bread-making process

Accessions	Origin of accessions	Date of heading (dd. from the 1 st April)	Plant height (excised spike) (cm)	Spike's length (cm)	Total plant height (cm)	Test weight (kg/hL)	1000-kernel weight (g)
Timilia 01	Maletto (CT)	41	128	10.5	138.5	81.1	34.0
Timilia 02	Gangi (PA)	48	105	11.0	116.0	82.2	30.0
Timilia 03	Polizzi Generosa (PA)	46	136	11.0	147.0	82.7	34.0
Timilia 04	Vizzini (CT)	41	122	12.0	134.0	79.3	38.0
Timilia 07	Caltagirone (CT)	47	97	10.0	107.0	81.5	31.0
Timilia 08	Mezzojuso (PA)	48	125	10.0	135.0	81.3	35.0
Timilia 09	Grammichele (CT)	46	106	9.5	115.5	78.8	36.0
Timilia 13 rb	Giuliana (PA)	48	110	11.5	121.5	82.5	34.0
Timilia 14	IHAR 27018	45	120	10.5	130.5	76.1	36.0
Timilia SG2	IHAR 27314	42	129	11.0	140.0	81.6	33.0
TimiliaSG1	IHAR 27012	45	117	10.5	127.5	82.1	38.0
Bronte	Tester	25	89	8.0	97.0	82.9	50.0
Ciccio	Tester	28	71	7.0	78.0	82.7	44.0
Platani	Tester	25	70	6.5	76.5	82.7	47.0
Simeto	Tester	26	76	7.0	83.0	81.3	54.0
AVERAGE		40.1	106.7	9.7	116.5	81.3	38.3
STD. DEV.		9.1	21.8	1.8	23.4	1.9	7.2

Table 1 - Principal bio-agronomic characters and some morpho-biometric data of accessions of “Timilia” and 4 tester varieties.



Figure 3 – Typical Sicilian bread “Pane nero di Castelvetro”, obtained by a variable share of Timilia’s whole grain flour.

MATERIALS AND METHODS

Starting material is constituted by a collection of 55 Sicilian durum wheat landraces. Eleven accessions of “Timilia”, 8 derived from several Sicilian areas and 3 derived from bank of germplasm IHAR (Plant Breeding and Acclimatization Institute Radzikow – Poland), were grown in the year 2004/2005 in Sicily (Enna), compared with 4 testers varieties, in plot of 6 m², in order to detect bio-agronomic characteristics and morpho-biometric parameters (Tab. 1).

Storage proteins, extracted by 26 seeds for each population, were characterized by SDS-PAGE on polyacrilamide gel electrophoresis for identification of HMW and LMW glutenin subunits, according to Dal Belin Peruffo *et al.* method (1981). Moreover it has been carried out an experimental bread-making test, according to AACC method n° 10-10, modified for durum wheat.

RESULTS AND DISCUSSION

The results show that the eleven accessions of “Timilia” present later date of heading and higher plants, compared with tester varieties. Moreover, all Timilia’s accessions present the highest length of spike. Regarding 1000-kernel weight, all accessions have registered low values (Tab. 1). Furthermore, tested genotypes showed high and comparable values of protein content (Fig. 4).

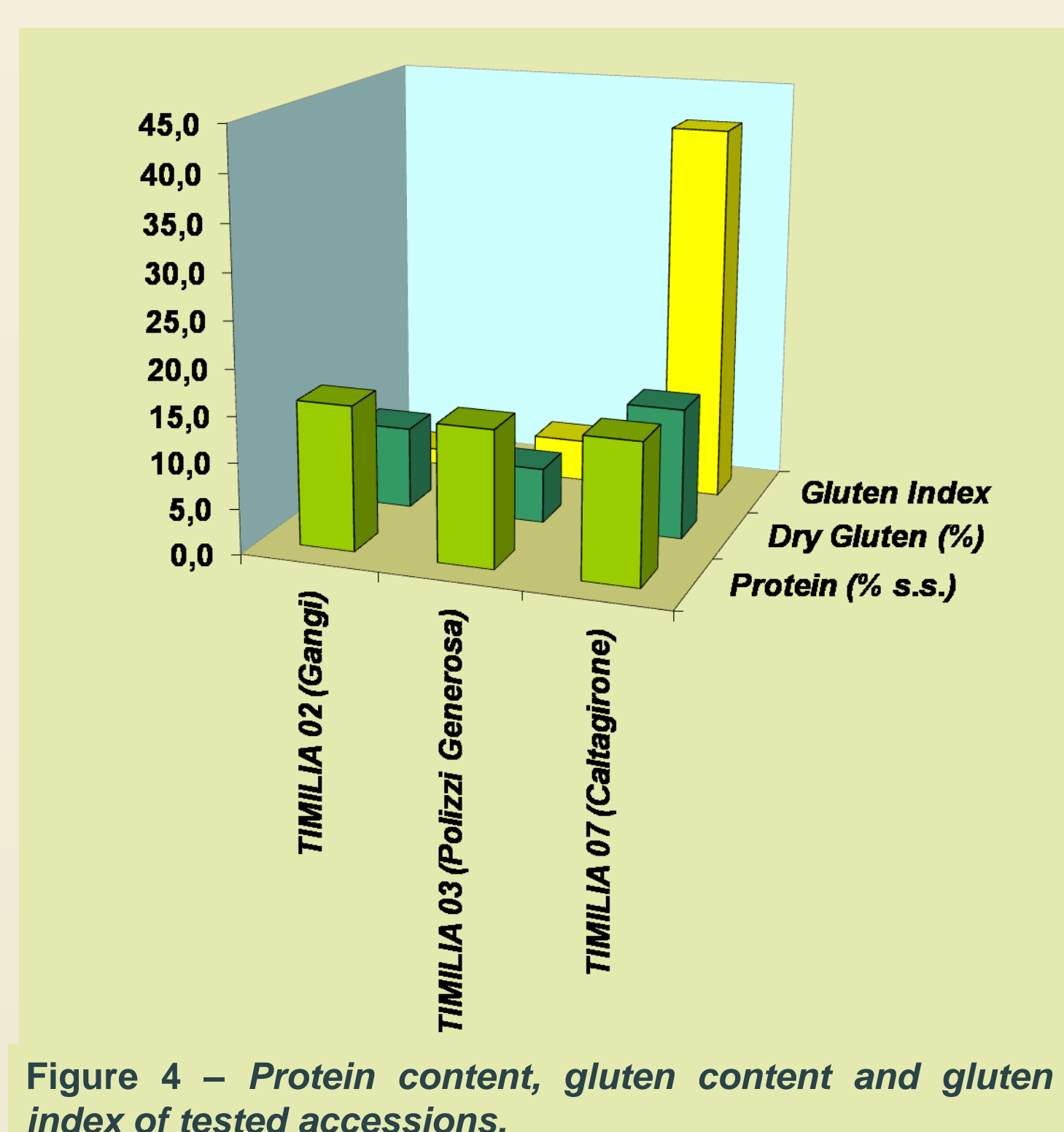


Figure 4 – Protein content, gluten content and gluten index of tested accessions.

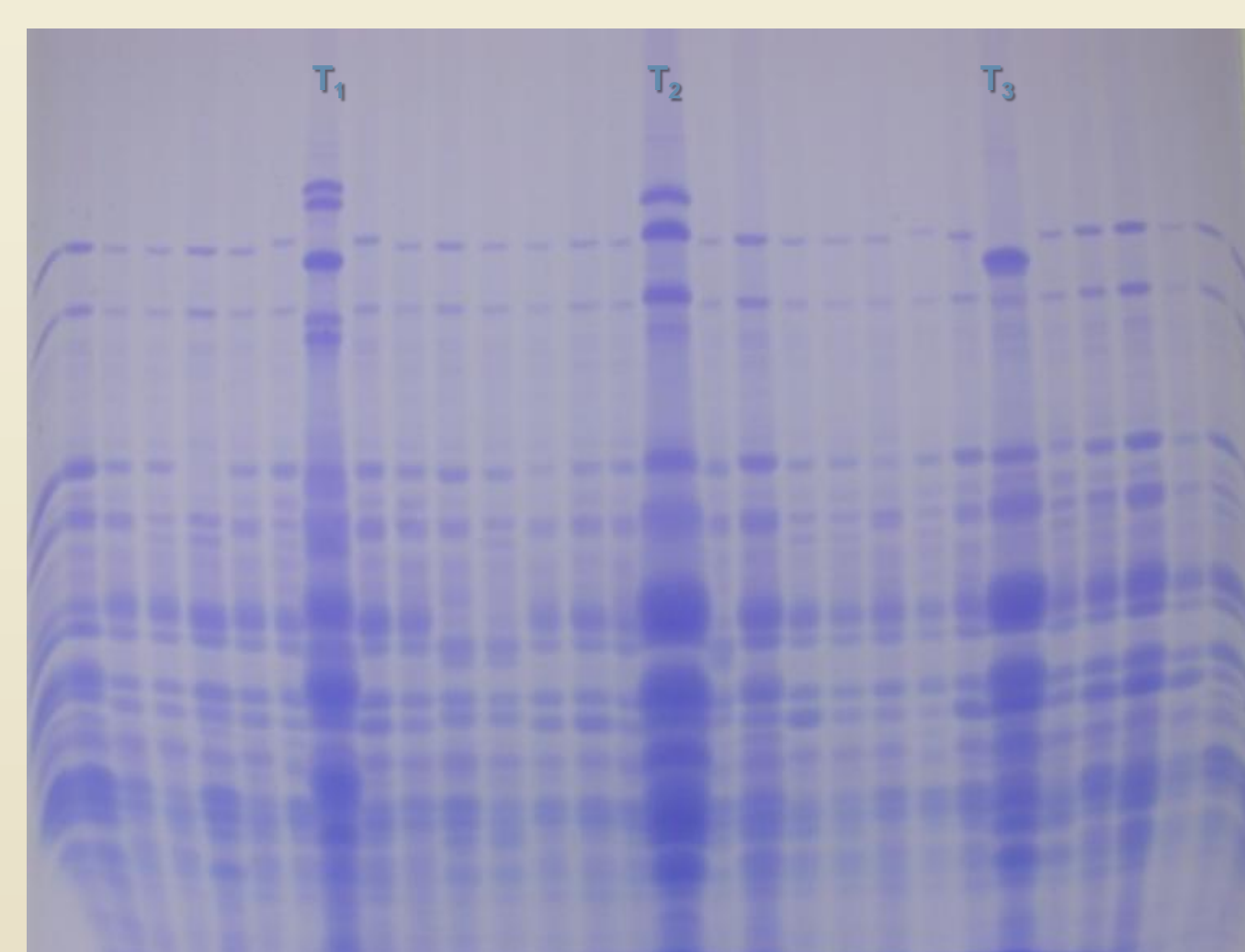


Figure 5 – SDS-PAGE of storage proteins from 26 seeds of Timilia. Tester 1: Pandas (*T. aestivum*); Tester 2: line CTA 472; Tester 3: Valbelice (*T. Turgidum ssp durum*).

Electroforetic characterization of storage proteins has highlighted a certain variability among accessions but a good uniformity within each accession. Particularly, “Timilia” landrace shows HMW “6+8” subunits pair, and LMW type “2” (Fig. 5).

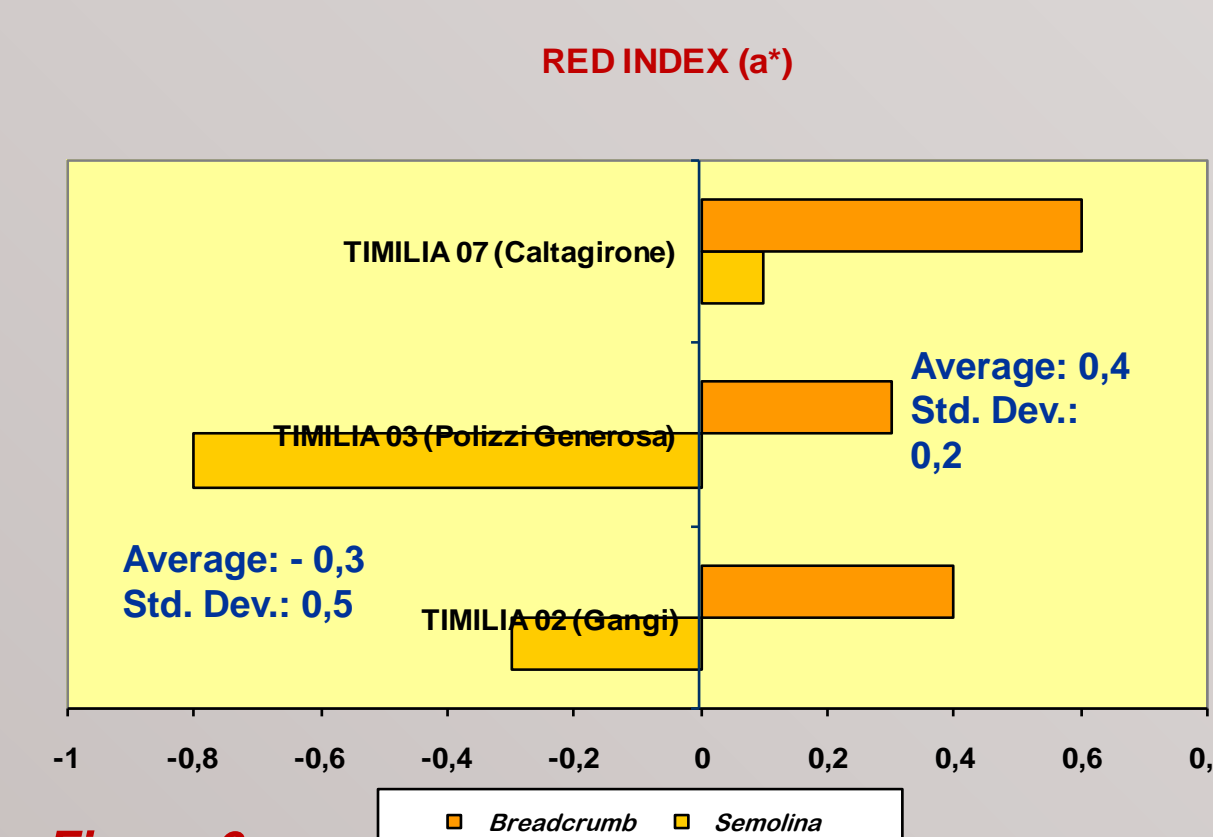


Figure 6

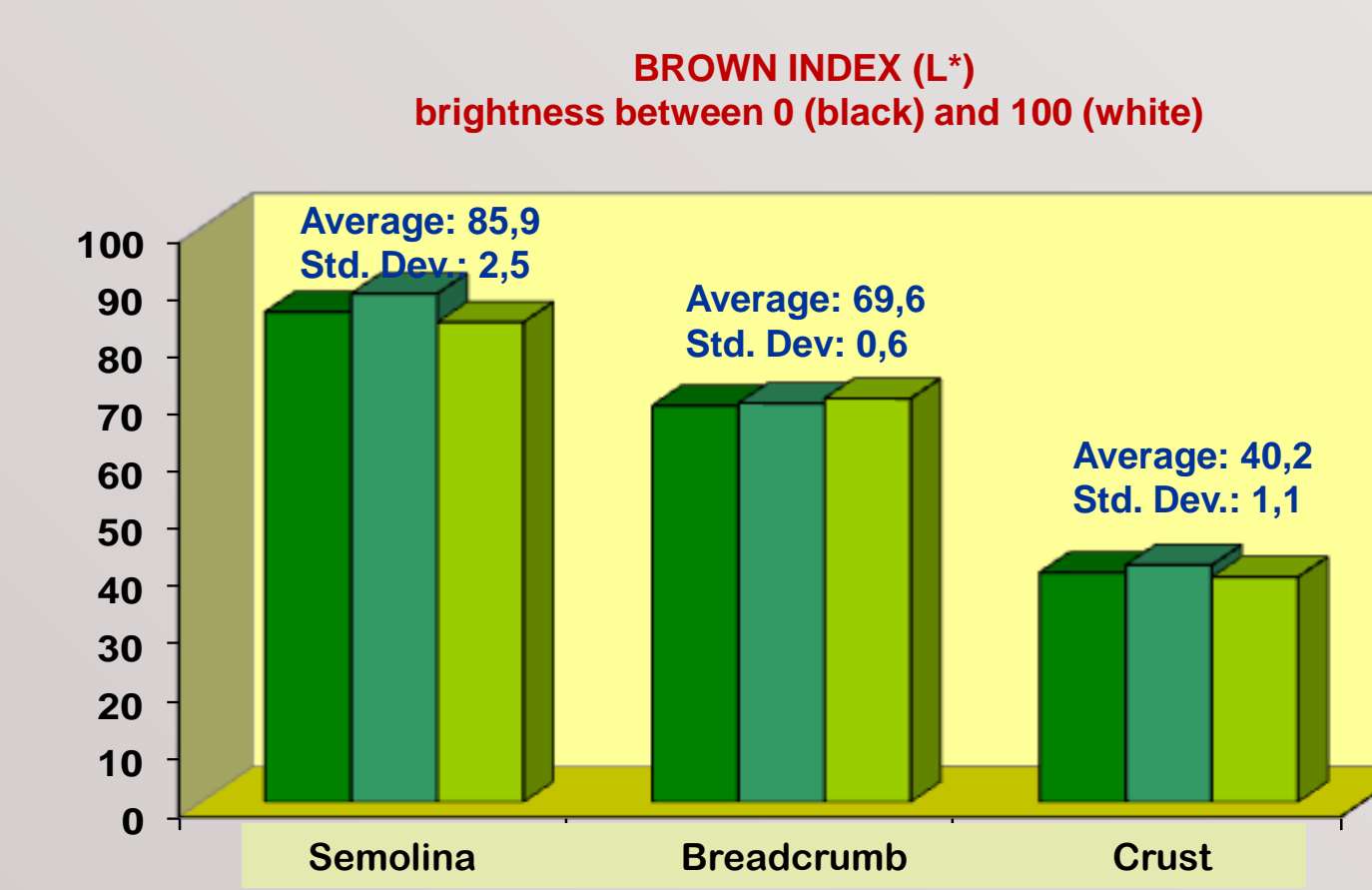


Figure 7

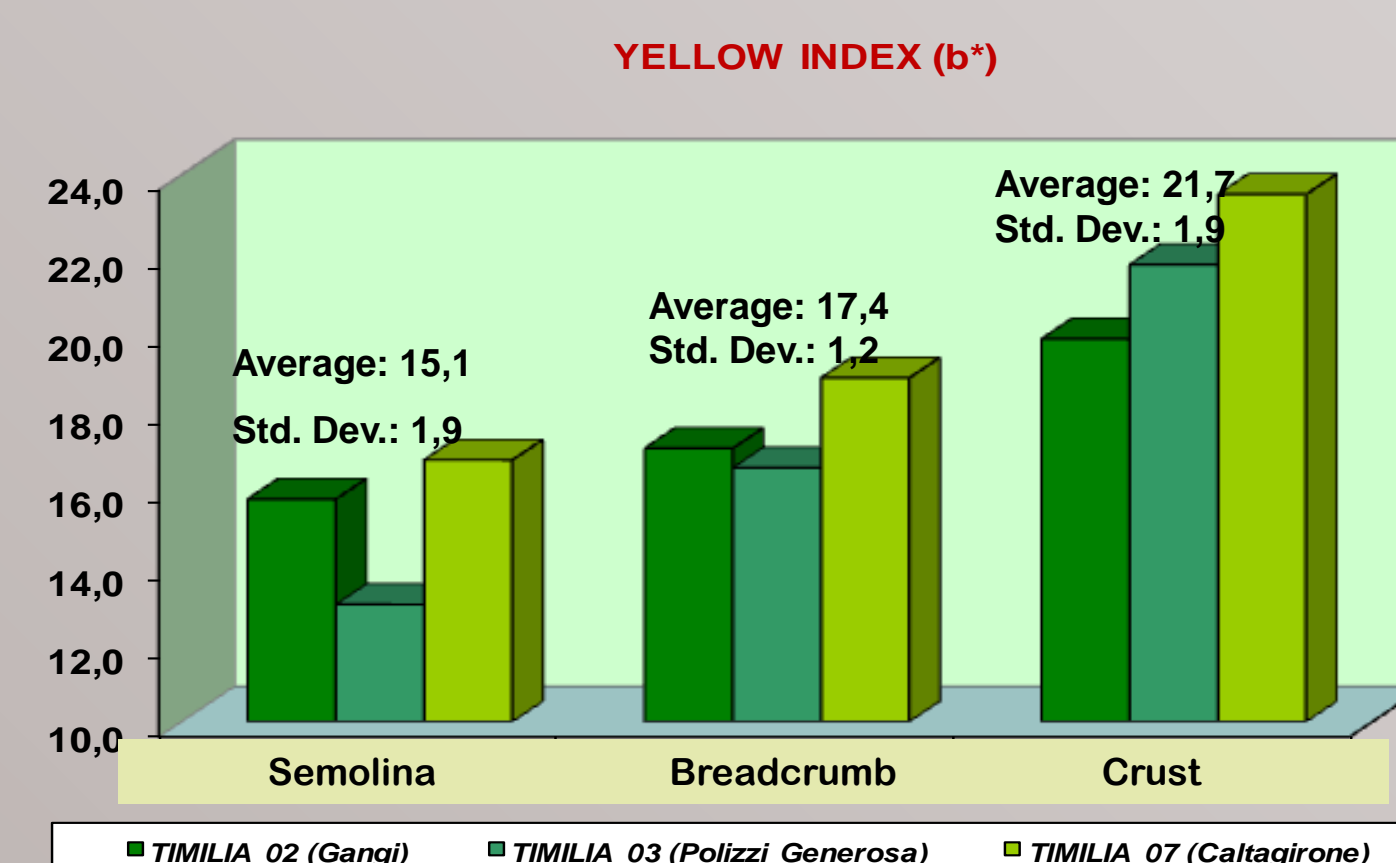


Figure 8

ACCESSIONS	Volume (cm ³)	Height (mm)	Weight (g)	Porosity (1-8)*
TIMILIA 02 (Gangi)	492.5	83	149.6	6
TIMILIA 03 (Polizzi Generosa)	510.0	85	146.8	6
TIMILIA 07 (Caltagirone)	477.5	85	164.5	5
AVERAGE	493.3	84.3	153.6	5.7
Std. Dev.	16.3	1.2	9.5	0.6

Table 2 – Results of experimental bread-making test



Figure 9 – Experimental loaves obtained using semolina of two accessions of Timilia.

The results of rheological analysis and of experimental baking test confirm the good bread-making aptitude of accession “Timilia 03” (Tab. 2, Fig. 10). Colorimetric indexes of semolina, crumb and crust point out the peculiar characteristics of Timilia landrace, known for typical dark coloration of bread (Figures 6-7-8-9).

CONCLUSIONS

Sicilian landraces of durum wheat represent a precious source of biodiversity. Morphologic, agronomic and qualitative analysis of “Timilia” accessions showed a significant variability for all bio-agronomic and qualitative parameter. Furthermore, semolina of “Timilia” presents very peculiar qualitative characteristics which make this landrace particularly appropriate to be used, alone or in mixture, in production of handmade bread as “Pane nero di Castelvetro” (TP) and bread from “Isnello” (PA).

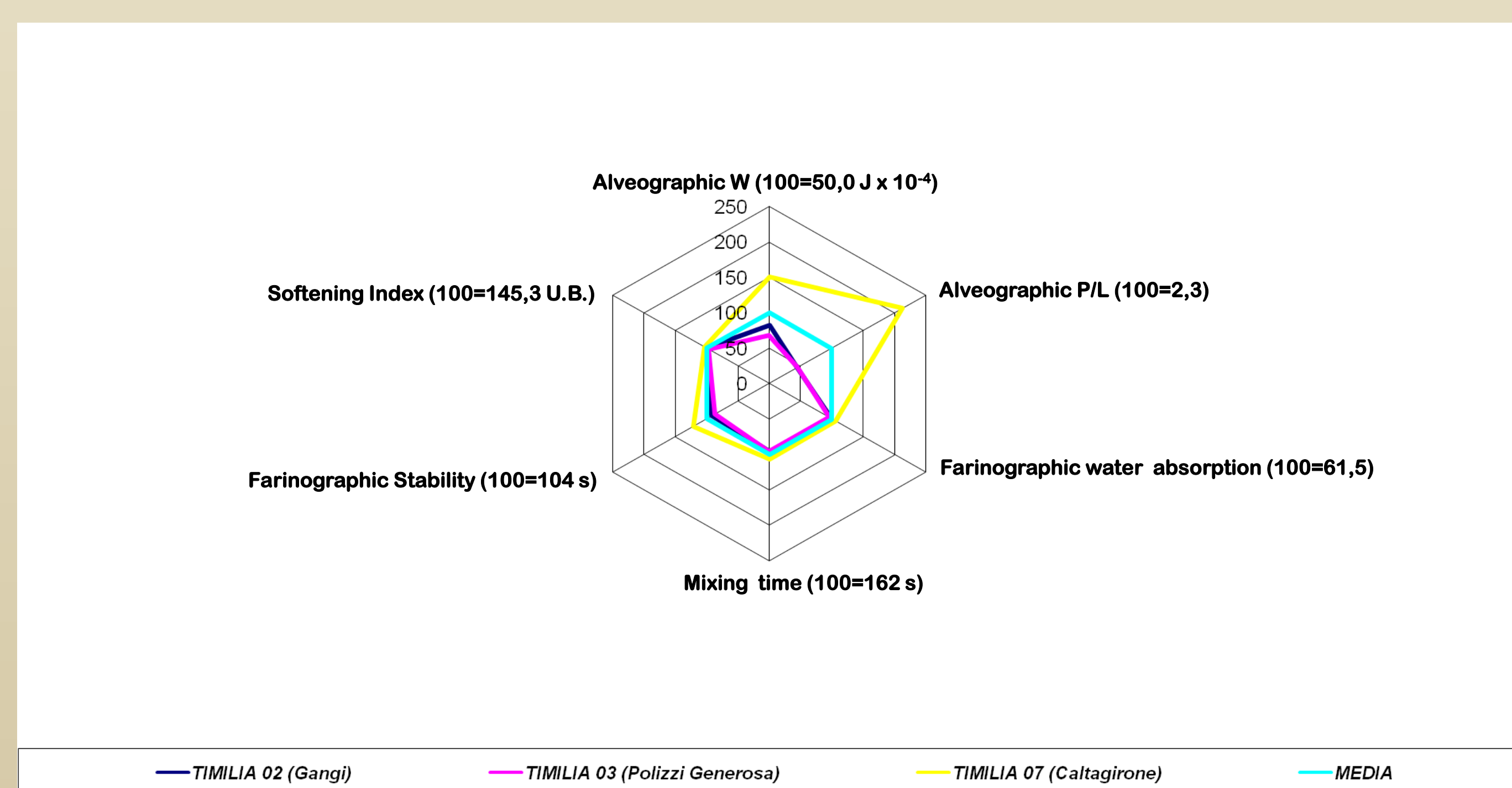


Figure 10 - Results of alveographic and farinographic analysis on tested “Timilia” accessions.