

THE CHARACTERS ANALYSIS AND CREATION OF SOME REGRESSION MODELS AT SPECIES *SORGHUM HALEPENSE*

ANALIZA CARACTERELOR CANTITATIVE ȘI CREAREA UNOR MODELE DE REGRESIE LA SPECIA *SORGHUM HALEPENSE*

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Abstract: In year 2008, *Sorghum halepense* samples were gathered from 16 localities in Timis County in order to initiate a study of plant height, number of internodes, length of the last internodes, panicle length, and number of branches. The data statistical interpretation was realized throughout SPSS. Length of the last internodes and panicle length are proved to be, after statistical interpretation, the factors with the higher influence on plant height. We observed that the length of the last internodes and panicle length exerted a major influence on plant height achieving a correlation coefficient between 0.481 and 0.865. Correlation is significant at 0,05 level.

Rezumat: În anul 2008, s-au recoltat probe de *Sorghum halepense* din 16 localități (județul Timiș) pentru studierea înălțimii plantelor, lungimea ultimului internod, lungimea paniculului și numărul de frați. Interpretarea statistică a datelor s-a realizat cu programul SPSS. Lungimea ultimului internod și lungimea paniculului s-au dovedit a fi după interpretarea statistică factorii cu cea mai mare influență asupra înălțimii plantelor. Acești factori au influențe majore asupra înălțimii plantei, coeficienții de corelație fiind cuprinși între 0,481 și 0,865. Valoarea de garanțare a rezultatelor este de 0,05 (5%).

Key words: *Sorghum halepense*, plant height, number of internodes, length of the last internodes, panicle length, number of branches

Cuvinte cheie: *Sorghum halepense*, înălțimea plantei, numărul de internoduri, lungimea ultimului internod, lungimea paniculului, numărul de frați

INTRODUCTION

Sorghum halepense is considered to be the most damaging weed in the world which produce great loses in agricultural crops in country such as: Argentina, Israel, SUA, Mexic, URSS etc [HANSON and col., 1976; HOLM and col., 1977; KEMPEN, 1984; BRIDGES and col., 1989].

This morphological study was initiated relaying on the desire to know and for a better understanding of these invasive weed and doe the observations regarding the financial outcome in order to reduce the number of *Sorghum halepense* plants, yield losses, as well the lack of data regarding the biology of this species.

Consulting the references, we can conclude that there are some quantitative limits regarding the morphological characters of plants, and on the other hand there is no perfect correlation between the recorded data, in some paper works the presence of Johnson grass as annual species in North Europe is recorded [LAMBINON and col., 1992; MIRIȚESCU, 1998].

MATERIAL AND METHODS

Sorghum halepense probes were taken from 16 localities in Timis county: Timișoara, Voiteg, Jebel, Gătaia, Lugoj, Buziaș, Lovrin, Grabaț, Gotlob, Dudeștii Vechi, Jimbolia, Sînnicolau Mare, Cărpiniș, Becicherecul Mic, Șandra and Biled. From each locality 30 samples were gathered.

The observations were made in September when the plants reached the maturity phases, recording plant height, number of internodes, length of the last internodes, panicle length, and number of branches.

The morphological characters were assessed throughout biometrical measurements with a rule. Johnson grass plant material was taken from maize field.

The data statistical interpretation was realized throughout SPSS.

The height of the plant was considered to be the most reliable factor. Some factors were analyzed which reveal:

- ✓ The existence and correlation intensity: coefficient Pearson (R), with boundaries between -1 and +1; coefficient Durbin-Watson with values between +1 and +3;
- ✓ Interpretation of Pearson Correlation and testing of significance level using T test
- ✓ Mean and Standard Deviation.

RESULTS AND DISCUSSIONS

Table 1 presents recorded data regarding **factors mean**: plant height, number of internodes, length of the last internodes, panicle length, and number of branches. Due to the major influence of length of the last internodes and panicle length we have calculated their percent in relation with plant height.

Table 1.

The results following statistical interpretation of quantitative determination of species *Sorghum halepense* L (Pers) recorded in Timis county, 2008

Locality	Mean values						Correlations			Strong correlation between plant height and other factors
	Plant height	Nr. of internodes	Nr. of internodes	Length of last internodes (% plant height)	Panicle length (% Plant height)	Nr. of branches /panicle	Coef. Corel (R)	F Change	Sig. F Change	
Lowrin	162.16	2.73	6.03	28	20	45.43	0.938	45.816	0.000	0.778(**) Length of last internodes
Sannicolau Mare	153.33	3.20	6.33	30	19	36.60	0.933	42.176	.000	.792(**) Panicle length
Dudestii Vechi	184.81	4.10	7.23	30	18	38.33	0.639	4.316	.009	0.778(**) Length of last internodes
Carpinis	133.80	2.47	6.27	34	18	24.53	0.938	38.627	.000	.838(**) Length of last internodes
Gotlob	142.60	1.80	7.10	32	18	33.87	0.720	6.734	.000	.654(**) Lungimea ultimului internod
Jimbolia	145.00	2.63	6.53	29	17	30.87	0.691	5.703	.002	.592(**) Length of last internodes
Grabat	151.03	6.93	5.23	34	18	28.07	0.917	32.810	.000	.733(**) Length of last internodes
Biled	171.59	2.60	5.80	27	18	31.13	0.588	3.296	.027	.271 Panicle length
Sandra	160.51	1.80	8.13	29	19	31.43	0.902	27.287	.000	.865(**) Length of last internodes
Becicherecu Mic	169.70	3.20	7.43	31	15	39.03	0.845	15.572	.000	.678(**) Panicle length
Timisoara	174.28	1.80	6.37	28	19	37.63	0.803	11.363	.000	.645(**) Panicle length
Jebel	149.17	2.23	7.67	28	20	45.17	0.642	4.382	.008	.594(**) Length of last internodes
Voiteg	137.53	3.33	6.73	27	19	30.17	0.642	4.382	.008	.594(**) Length of last internodes
Birda	140.03	3.83	7.13	31	19	37.40	0.851	16.424	.000	.718(**) Panicle length
Gataia	152.67	1.67	7.73	28	18	36.77	0.786	10.084	.000	.762(**) Panicle length

Locality	Mean values						Correlations			Strong correlation between plant height and other factors
	Plant height	Nr. of brethren	Nr. of internodes	Length of last internodes (% plant height)	Panicle length (% Plant height)	Nr. of branches /panicle	Coef. Corel (R)	F Change	Sig. F Change	
Lugoj	171.1	2.47	6.33	30	16	39.97	0.697	5.891	.002	.481(**) Nr. of internodes

The factor *length of the last internodes* does not recorded a high variation in all 16 localities, the values oscillated between **27%** and **34 %** (table 1), presented as well in graphic 1. The same situation is present in panicle length **15%** and **20%** (table 1).

The mean value of plant height was recorded **133.8 – 184.81 cm**.

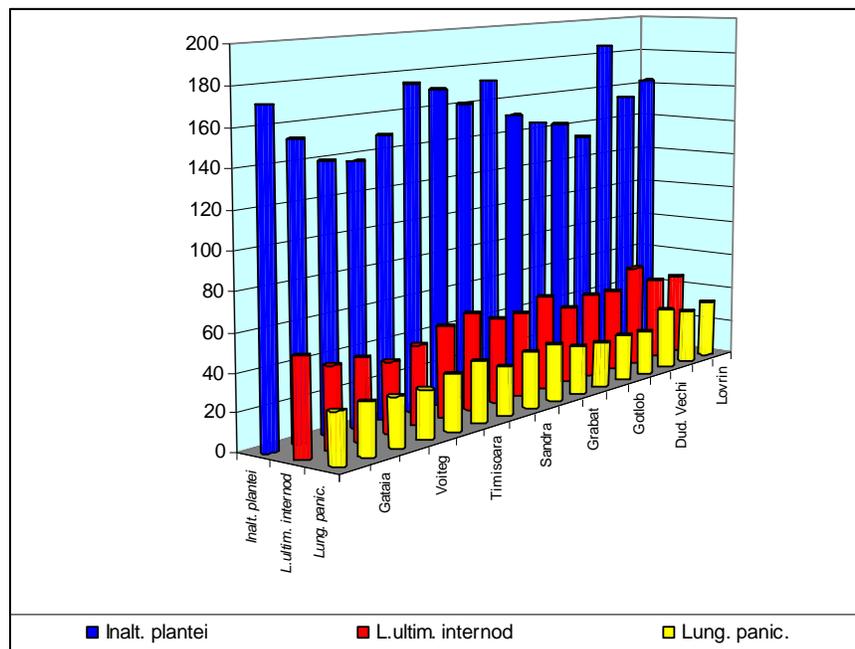


Figure 1. Mean values of factor with high correlation in studied localities

Following correlative and regression analyses, strong connection were established in all localities.

The higher correlation was achieved in locality: Lovrin – 0.938; Sannicolau Mare – 0.933; Carpinis – 0.938; Grabat – 0.917; Sandra – 0.902 (table 1.), those values confirm the relation between parameters.

A weaker connection was determined in localities: Biled – 0.558; Jebel – 0.642; Voiteg – 0.642; Dudestii Vechi – 0.639; Jimbolia – 0.691; Lugoj – 0.697 (table 1. and figure 2).

In order to establish the correlation pattern the exclusion method was used (exclusion of factors with higher significance)

Based on correlation coefficients we can affirm that the successful patterns are those who include all independent factors, therefore were selected in the synthesis table 1 as the most important.

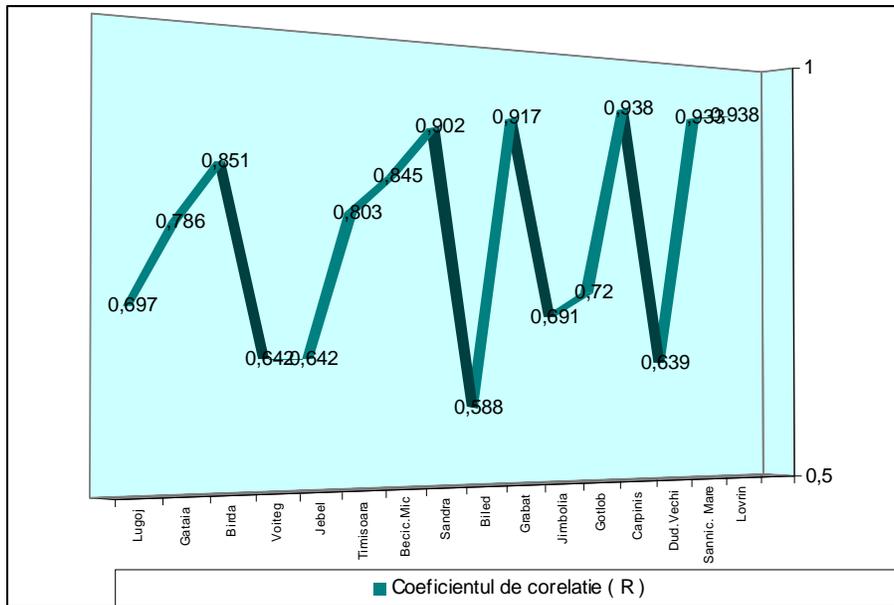


Figure. 2 - Correlation coefficient Pearson (R)

CONCLUSION

Variation of morphological characters was observed: plant height with variation between 82.5 and 216.5, mean 154.43 cm. Minimal and maximal height (82.5 cm respectively 216.5 cm) are not to be found in papers such FLORAE ROMANIA (100-200 cm); **Internodes length** – varied between 4 and 11, mean 6.75 internodes/plant; **length of the last internodes** – values between 20 cm and 78.3 cm, mean 29.75 cm; **panicle length and branches/panicle** was specific to each plant with a mean of 18.18 cm respectively 35.4 branches/panicle. According FLORAE ROMANIA vol. XII, 1972, the length of the panicle lies between 20-25 cm, from our measurement resulted that minimal length (19 cm) as well the maximal length (52.2 cm) exerted differences facing the international references.

A low correlation was recorded in localities: Biled 0.558; Jebel 0.642; Voiteg 0.642; Dudești Vechi 0.639, Jimbolia 0.691, Lugoj 0.697, resulting the fact that soil type, soil nutrients, climatic condition and other factors exerted influence on plant height.

Length of the last internodes and panicle length are proved to be, after statistical interpretation, the factors with the higher influence on plant height.

BIBLIOGRAFY

1. ACCIARESI H., CHIDICHIMO H., 2005 - Ecophysiological response of *Sorghum halepense* populations to reduced rates of nicosulfuron, Pesquisa Agropecuaria Brasileira, Vol. 40, pag. 541-547;
2. BRIDGES C., CHANDLER J., 1989 - A population level temperature-dependent model of seedling johnsongrass (*Sorghum halepense*) flowering, Weed Science, Vol. 37, pag. 471-477;
3. CHIRIȚĂ RAMONA, K.F. LAUER, N. SARPE, 2004 – Die Bekämpfung Der Mohrenhirse (*Sorghum Halepense*) in mais mit neuen Breitbandherbiziden im Banat (Westrumänien),

- Zeitschrift Fur Pflanzenkrankheiten Und Pflanzenschutz, Journal Of Plant Diseases And Protection, Verlag Eugen Ulmer Stuttgart, Germania, pag. 725-731;
4. HANSON C.; RIECK C., HERRON J., WITT W., 1976 - The johnsongrass problem in Kentucky. Agronomy Notes. Lexington, KY: University of Kentucky, College of Agriculture; Cooperative Extension Service, Vol. 9(4); pag. 1-8;
 5. HOLM L., PANCHO J., HERBERGER P., 1977 - The Worlds Worst Weeds, distribution and Biology, The University Press of Hawaii, Honolulu, Hawaii, pag. 609
 6. KEMPEN H., 1984 - Cotton production losses from weed competition in Kern County, a three year evaluation, In: Proceedings, Western Society of Weed Science, No. 37, pag. 47-51;
 7. MCWHORTER G., 1993 - A 16-year survey on levels of Johnsongrass (*Sorghum halepense*) in Arkansas, Louisiana, and Mississippi, Weed Science, No. 41(4), pag. 669-677;
 8. MIRIȚESCU M., 1998 - Cercetări asupra biologiei și combaterii speciei *Sorghum halepense* (L.) Pers., Teză de doctorat, București;
 9. ORIOL IRINA, 2004 - Statistica și analiza datelor, Editura AAP, Chișinău, 2004
 10. TORMA M., KAZINCZI G., HÓDI L., 2006 - Postemergence herbicide treatments in maize against difficult to control weeds in Hungary, Journal of Plant Diseases and Protection, Supplement, pag. 781-786;
 11. ULUDAG A., UREMIS I., ARSLAN M., GOZCU D., 2006 - Allelopathy studies in weed science in Turkey - A review, Journal of Plant Diseases and Protection, Supplement, pag. 419-426;
 12. VASILAKOGLU I., DHIMA K., ELEFTEROHRINOS I., 2005 - Allelopathic potential of bermudagrass and johnsongrass and their interference with cotton and corn, Agronomy Journal, Vol. 97, pag. 303-313;