«Assessment of stress resistance of wheat varieties based on the cluster analysis of biopotential parameters»

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• Using cluster analysis for the identification of wheat varieties that upon pairwise comparison could be unambiguously categorized as displaying identical (similar) resistance to heat or cold stress.

• Used 7-14 day wheat seedlings of “Novosibirskaya 18”, “Omskaya 18” and “Novosibirskaya 44” varieties that were subjected to increased (up to 40°C) or decreased (down to 5°C) temperatures.

• Each sample was shifted to a stress temperature three times, magnitude of the seedling biopotentials as well as temperature were monitored and automatically recorded into a database.

• The maximum, average and minimum values of 8 types of signals (filtered, temperature-normalized, differentiated, etc.) were used for cluster analysis.
Solution methods

• Matlab environment was used for cluster analysis of the data obtained based on the minimum, average and maximum values of different types of signals.

• Both raw and normalized (using Matlab-embedded normalization functions) values of the listed parameters were used.

• Cluster analysis was performed using the Matlab functions kmeans and fcm.
Conclusions

• Our data indicate that the methods of cluster analysis of data obtained for informative parameters of biopotential and its derivatives are fully applicable for the comparative assessment of reaction of various wheat varieties to temperature stress.

• These methods allow a more qualitative description of differences between the established wheat varieties, as well as of the varieties at different stages of selection.
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