

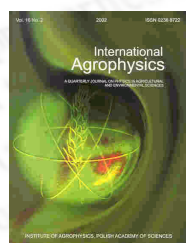
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Multivariate analysis of image descriptors of common wheat (*Triticum aestivum*) and spelt (*T. spelta*) grain infected by *Fusarium culmorum*

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**abstract** The response of five spring common wheat and five spring spelt cultivars to the infection of their spikes with *Fusarium culmorum* was examined using the shape and colour analysis of kernel images. The results obtained suggest that there is a significant correlation between the thousand kernel weight (TKW) and the shape descriptors of the kernel image: area, perimeter, length and width. Such a correlation was observed especially for TKW and image area (Pearson's correlation coefficient  $r$  ranged from 0.737 for common wheat to 0.914 for spelt) as well as for the shape coefficient S5 calculated on the basis of image length and area ( $r$  equalled 0.716 and 0.886, respectively). A significant correlation was also observed for TKW and H (hue), S (saturation) and I (intensity) of colour of the kernel image. The results of cluster analysis performed for the values of H, S, I and S5 permitted precise differentiation between kernels obtained from control and infected heads of common wheat and spelt. A reliable evaluation of grain infection by *F. culmorum* was possible only when the results of both shape and colour analysis were considered.

**keywords** *Fusarium* head blight, grain, image analysis, wheat, spelt

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