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Plant growth regulators to manipulate oat stands

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### Abstract

Plant growth regulators (PGRs) are exogenously applied chemicals that alter plant metabolism, cell division, cell enlargement, growth and development by regulating plant hormones or other biological signals. For example, some PGRs regulate stem elongation by inhibiting biosynthesis of gibberellins or through releasing ethylene. PGR effects are widely studied and reported on barley (*Hordeum vulgare* L.) and wheat (*Triticum aestivum* L.), whereas there are only a few reports addressing oat (*Avena sativa* L.). This is likely to be a result of smaller acreage and lower intensity of oat management and production and hence a reduced need for stem shortening by PGRs. However, this is not the case for all cereal producing regions and there exists a need to understand the potential application of PGRs to oat production. This paper represents a review of the potential of PGRs to regulate stem elongation and other biological traits governing plant stand structure and yield components, with special emphasis on oat and its responses to PGRs. Yield improvement requires more heads per unit land area, more grains per head or heavier grains. Of these yield-determining parameters, the number of head bearing tillers and grain numbers per head, compared with grain weight, are more likely to be improved by PGR application. In the absence of lodging, PGR may reduce grain yield due to potential reduction in mean grain weight and/or grain number. Cultivation systems aiming at extensive yields with intensive use of inputs likely benefit from PGR applications more often compared with low or moderate input cultivation, for which cost effectiveness of PGRs is not frequently reached.

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