

Cultivar Choice

May | 2022



Factsheet about integrated weed management



Cultivar choice

Suppressive crop varieties will reduce the fitness of the weeds, while tolerant varieties will maintain high yield levels under weed pressure, but will not necessarily reduce weed densities and therefore could result in a build-up of the weed population¹.

The choice of cultivar is an important way to:

- **prevent high yield losses due to occurring weeds**
- **to reduce the built-up of weed populations.**

Applicability

The choice for a specific cultivar depends on more than the weed conditions alone. Soil conditions, pest and disease management as well as market demand are important factors for farmers when choosing a cultivar.

While selecting a cultivar, include information on traits as the timing of canopy closure (quick initial growth), optimal seeding date, crop height, and soil coverage during the season, and use that information to choose the most suitable cultivar to support IWM. Ask your supplier about these traits, when information is not made publicly available.

Another strategy could be the use of cultivar mixtures in intercrops. Selecting cultivars with different niches in terms of nutrient, water and light requirements might lead to less favourable conditions for weeds to thrive in. See the IWMPRAISE factsheet about Intercropping for more information about this strategy.

Efficacy and core results



For winter wheat and barley, information on effects of variety on weed density and biomass is available².



The use of spring barley varieties with increased crop height and canopy light interception can reduce weed dry matter up to 48% compared to the use of other cultivars³.



In addition to the direct effect of cultivar choice on weed suppression, cultivar choice can influence the potential use of other weed management strategies. Cultivars with increased crop height and leaf area will improve weed suppression, but can also limit the possibilities for weed harrowing⁴. Varieties that have a shortened growth season, can be combined with tactics such as stale seedbeds.

What to consider?

Many traits have been found to be associated with weed suppressive cultivars:

- crop height³
- early vigour (high early growth rate, expressed as a rapid emergence, early leaf area development, early soil cover)¹ ⁵ ⁶
- tillering capacity
- canopy architecture⁷
- root length
- root elongation rate
- number of root tips
- total root length⁸ ⁹
- allelopathy

¹ Hansen PK, Willas J & Kristensen K (2008) A weed suppressive index for spring barley (*Hordeum vulgare* L.) varieties. *Weed Research* Oxford, 48, pp. 225-236. <https://doi.org/10.1111/j.1365-3180.2008.00620.x>

² Christensen, S. & Rasmussen, Gitte & Olesen, Jørgen. (1994). Differential weed suppression and weed control in winter wheat. 40. -Didon, U.M.E.. (2002). Variation Between Barley Cultivars in Early Response to Weed Competition. *Journal of Agronomy and Crop Science*, 188: 176-184. <https://doi.org/10.1046/j.1439-037X.2002.00566.x>

³ Christensen (1995). Weed suppression ability of spring barley varieties. *Weed Research* 35(4): 241-247. <https://doi.org/10.1111/j.1365-3180.1995.tb01786.x>

⁴ Rasmussen, J., Kurtzmann, J.I. and Jensen, A. (2004). Tolerance of competitive spring barley cultivars to weed harrowing. *Weed Research*, 44: 446-452. <https://doi-org.ezproxy.library.wur.nl/10.1111/j.1365-3180.2004.00419.x>



The potential of a cultivar to suppress weeds cannot be ascribed to a single trait, because all traits are interlinked. The importance of a trait for the suppressive ability of a variety can vary between locations and years⁷¹. It is important to base the choice of cultivar on knowledge of the specific situation with regard to weed community composition, soil conditions, climate and many more.

Costs

The prices of seeds of more robust varieties might be higher than seeds of commonly used varieties while other costs are avoided:

- Reduced crop-weed competition leads to less yield loss;
- Decreased need for and associated costs of direct control weed populations that otherwise would build up.



Figure 1| Different cultivars of sorghum with distinctive phenotypes.

Extra information

Have look at the study¹¹ that compares winter wheat and spring barley varieties in their weed suppressiveness ability in the index that is developed in this study, based on their final height, leaf-area and early growth.

See <https://iwmpraise.eu/publications/> for all weed management strategies.



Figure 2| Selection trials with different cereal varieties.

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⁵¹ Drews S, Neuhoﬀ D & Köpke U (2009) Weed suppression ability of three winter wheat varieties at diﬀerent row spacing under organic farming conditions. *Weed Research* 49: 526-533. <https://doi.org/10.1111/j.1365-3180.2009.00720.x>

⁶¹ McDonald AJ, Riha SJ & Ditommaso A (2010) Early season height diﬀerences as robust predictors of weed growth potential in maize: new avenues for adaptive management? *Weed Research* 50 (2): 110-119. <https://doi.org/10.1111/j.1365-3180.2009.00759.x>

⁷¹ Andrew IKS, Storkey J & Sparkes DL (2015) A review of the potential for competitive cereal cultivars as a tool in integrated weed management. *Weed Research* 55: 239-248. <https://doi.org/10.1111/wre.12137>

⁸¹ Fargione J & Tilman D (2006) Plant species traits and capacity for resource reduction predict yield and abundance under competition in nitrogen-limited grassland. *Functional Ecology* 20: 533-540. <https://doi.org/10.1111/j.1365-2435.2006.01116.x>

⁹¹ Stevanato P, Trebbi D, Bertaggia M, Colombo M, Broccanello C, Concheri G & Saccomani M (2011) Root traits and competitiveness against weeds in sugar beet. *International Sugar Journal* 113: 497-501.