Weed Fact Sheet
Apera spica-venti

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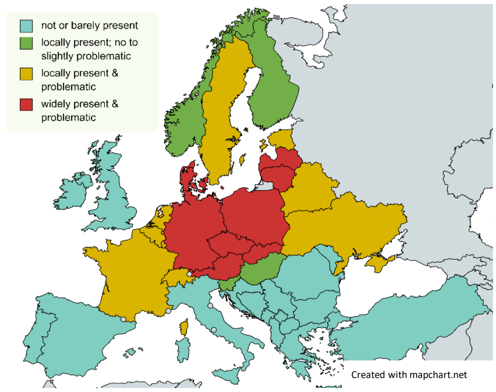
Apera spica-venti is the most common grass weed species in winter cereals in Denmark, Germany, Poland, Czech Republic, Slovakia, Lithuania, Latvia and Austria, but also present in Belgium, Netherlands. Luxembourg, France, Switzerland, Sweden, Belarus, Ukraine and Russia. It is a weed problem due to high density levels and its competitive ability especially where there is a higher proportion of winter annual crops in rotation.



Weed Biology

EPPO-code (*latin*/common name)	APESV (*Apera spica-venti*, silky bentgrass)
Life cycle	Annual, winter annual
Germination window	Mostly autumn up to early spring
Max. generations/year	1
Occurrence in crop or cultivation system	Mostly related to cereals
Yield loss	2-8 kg/ha per plant/m² (threshold: ~30 plants/m²) (lowest in rye, highest in wheat)
Prefered environmental conditions	Lighter soils (sandy to sandy loam), tolerates temperate/continental winter climate

Ploidy	Diploid (2n=14)
Pollination	Cross-pollinating
Pollen dispersal	By wind
Seed shattering	Before Harvest
Fecundity *(seeds/plant)*	~2.000 – 20.000 depending on crop competition
Seed dispersal	By wind
Distance of seed dispersal	few meters from parent plant
Dormancy	low
Seed bank longevity	1-2 up to 7 years
Seed decline per year	~20-30%

Impact of Agronomic Measures on Occurrence and Spread

Soil cultivation

- profits from non-inversion tillage
- better to alternate inversion and non-inversion tillage **rather** than annual ploughing only
- seed dormancy during summer time reduces control effects of stubble tillage

Crop sowing date

- late drilling or stale seedbed preparation possible, but potentially less effective compared to other grasses due to long germination period

Crop competitiveness

- rye is more competitive than other cereals, but level is influenced by:
  - crop vigour, e.g. higher on fertile soils than on sandy soils and
  - varieties e.g. hybrids barley > 'normal' varieties

Crop rotation

- Occurrence and spread favoured by winter cropping (especially winter cereals)
- Germination predominantly in September **through to** November
- Minor problem in winter oilseed rape due to effective control by group 15(K3) herbicides (VLCFA)
- Occurrence in spring crops possible, but not common

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HRAC Europe

Observed Resistance in Europe

- widespread resistance to post-emergence herbicides
- up to 50% (or even more) of all infested fields, but regional differences
- most severe resistance problem in Germany, Poland and Czech Republic
- other countries are affected at **a** local level
- cross-resistance to all ALS-inhibitors and various combination of multiple resistance to ACCase, ALS- and PSII-inhibitors e.g. HRAC 2(B) & 5(C2), 1(A) & 2(B) or even 1(A),2(B) & 5(C2)
- combination of TSR and NTSR within a population or in individual plants occurs quite often
- soil residual herbicides e.g. HRAC 15(K3), 3(K1) are still active

Mode of Action	HRAC	Resistance level
ACCase	1 (A)	++
ALS	2 (B)	+++
PSII	5 (C2)	+
Microtubule Assembly	3 (K1)	n
VLCFA	15 (K3)	n

n = no reports

+ = low
++ = medium
+++ = high

Target-site resistance (TSR)

- ALS-inhibitors:
  well documented with four known mutations
  - Pro197, Trp574 (most common)
  - Ala122, Arg377
- ACCase-inhibitors:
  less common but appearing with mutation at two different positions
  1781 (Ile→Leu) and 2041 (Ile→Asn)
- PS-II-inhibitors: no TSR yet

Non Target-Site Resistance (NTSR)

- mechanism not known yet
- assumed to be caused by enhanced metabolic activity of enzyme systems like glutathione-S-transferases and P450-monooxygenases
- Affects all post-emergence herbicides (ACCase, ALS, PSII)
- Existing cross-resistance to different herbicides with hardly any impact on soil-residual herbicides

Best Management Practices

- to prevent and mitigate resistance development, follow the Guideline to the Management of Herbicide Resistance published by GHRAC
- rotate herbicides from different modes of action effective on the same target weed throughout the crop rotation
- integrate sequential application of soil residual and post-emergence herbicides to reduce selection pressure on post-emergence herbicides
- monitor results of herbicide applications to allow a timely adjustment of weed control strategies when necessary
- integrate non-chemical methods:
  - higher portion of spring crops reduces the appearance of *Apera* significantly
  - inversion soil tillage is useful in years with **insufficient** control leading to high seed production and entry into soil seed bank
  - combination of inversion and non-inversion tillage can reduce population density due to low persistence in soil seed bank

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