Weed Fact Sheet
Papaver rhoeas

Papaver rhoeas is dominant in Southern regions of Europe where it is frequently found. In Northern regions the weed is found less frequently but remains a problematic species where present.

Other species of the genus are less abundant and not reported as troublesome weeds, such as *P. argemome*, *P. hybridum*, or *P. dubium*. *P. rhoeas* commonly infests small grain cereals and other autumn and winter sown crops.

Weed Biology

EPPO-code	PAPRH
Life cycle	Annual
Germination window	From autumn to early spring
Flowering	April-July
Seed set	May to August
Occurrence in crop or cultivation system	Occurrence in crops sown in autumn-winter and early spring, both tilled and non-tilled
Yield loss	Crop yield loss can be as high as 40% and it varies greatly according to density, crop species and variety as well as pedo-climatic conditions
Preferred environmental conditions	Prefers calcareous soils and does not grow on clay and peat soils in most climatic conditions

Ploidy	Diploid (2n=14)
Pollination	Obligate cross-pollinating, thus highly genetically variable
Pollen dispersal	Insects
Fecundity *(seeds/plant)*	From a few hundred to several thousand according to the number of capsules
Seed dispersal	By wind
Distance of seed dispersal	10 to 20 m
Dormancy	Very high (with low germination rate)
Seed bank longevity	Very long (> 48 months)
Seed decline per year	~10% (>50% of viable seeds after 3 years)

Impact of Agronomic Measures on Occurrence and Spread

Germination and Dormancy

Tillage (or no-till farming) exposes seeds to light, thereby promoting germination. However, tillage can also bury seeds, inducing secondary dormancy and preventing germination. Soil disturbance however generally enhances germination (factors: timing, weather, depth) and can enable pre-sowing management

Soil Cultivations

With a very long seed bank longevity and high dormancy, ploughing after the harvest and no more soil inversion for the next 6 years is an efficient way to lower infestation; this can be improved if followed by a stale seedbed preparation

Crop Sowing date and Seed set

Emergence of *P. rhoeas* is more impacted by sufficient soil moisture and optimal temperatures than the date of sowing.

Good early season soil moisture favours *P. rhoeas* emergence, which supports delayed cereal sowing for lower in-crop densities

A dry autumn can completely stop weed emergence, therefore not supporting delaying cereal sowing

Crop rotation and Competitiveness

Crop rotation with alternation of winter and summer crops, competitive crop varieties and any measure which favours a good crop establishment are useful control tools.

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HRAC Europe

Identification Tips

- Cotyledons are linear and without hairs
- At seedling stage, it presents simple hairs in comparison to *Capsella bursa-pastoris*
- Leaves are pinnatifida to pinnatisect and can present white spots or veins
- Fruit has obovoid form and it does not have hairs

Observed Resistance in Europe

- Herbicide resistance to ALS-Inhibitors is widespread in central and southern Europe. It has been reported in Belgium, Denmark, France, Greece, Italy, Poland, Portugal, Spain, Sweden and UK
- Resistance to 2,4-D is documented in France, Greece, Italy, Spain and Portugal
- *P. rhoeas* has not been reported to have evolved resistance to residual herbicides commonly used for control in pre-emergence
- Multiple resistance between synthetic auxins (2,4-D) and ALS is substantially increasing. Multiple resistance is documented in Spain, Greece, Italy, France and Portugal

Target-site resistance (TSR)

- ALS-inhibiting herbicides are the only post-emergence herbicides affected in annual crops
- The most frequent TSR mutation is Pro-197, while Trp-574 is more rare
- Recently, the double Pro197Phe mutation has been demonstrated to confer broad resistance to ALS-inhibitors

Non-Target-Site Resistance (NTSR)

- Metabolic resistance can evolve in this species to both ALS-inhibitors and synthetic auxins
- Metabolic resistance seems primarily meditated by cytochrome P450 monooxygenases (P450s), both for ALS inhibitors and 2,4-D. Latest data support the involvement of a unique P450
- Reduced translocation has also been described in several 2,4-D resistant biotypes from Spain and Portugal
- Multiple resistance can co-exist both at population and plant level

Management practices

- To prevent and mitigate resistance development, follow the Guideline for the Management of Herbicide Resistance published by HRAC Global

Chemical

- Rotate herbicides with different modes of action (MoA) effective on the target weed throughout the rotation
- Integrate sequential application of soil residual and post-emergence herbicides to reduce selection pressure
- Use a mixture of products with different MoAs if the related active substances give high levels of control on the targeted weed
- Monitor results of herbicide usage to allow for a timely adjustment of weed control strategies

Non-chemical

- Alternate non-inversion tillage with ploughing every 6-7 years to reduce viable seeds in the seed bank
- Increase the rotation of winter and spring/summer crops
- Increase the competitiveness of cereal crops especially by using higher seed rates and/or competitive varieties
- Where feasible, prepare stale seedbeds to foster early germination and allow mechanical and chemical control before sowing of the crop
- Delaying the sowing date can be effective in reducing infestation levels, but outcomes are very dependent on climatic conditions which can foster staggered emergence
- Mechanical weeding with a tine flexible harrow in winter cereals can be effective at early growth stages

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