PRODUCT DATA SHEET

Amaranth

Botanical name	Amaranthus sp. L.
Seeding rate	0.4-1 kg/ha
Row spacing	30-50 cm for grain production
Sowing period	Early to late May for grain production, can be sown later if grown for forage
Sowing depth	1-1.5 cm (germinates in dark!)
TGW	0.5-1 g

General information and usage

- Other names: Pigweed
- Amaranth species for grain production: A. hypochondriacus (prince's feather), A. cruentus (red amaranth), A. caudatus (love-lies-bleeding), A. retroflexus (redroot amaranth), A. hybridus (green amaranth)

Amaranth grains can be used to prepare a variety of foodstuffs, including ones that can be consumed by Coeliac patients. Coeliac disease results in the inability to tolerate gluten, a component of protein that is present in all major grains (e.g. wheat, barley, rye, spelt). However, plants known as pseudocereals, which include amaranths, have no gluten. In addition, it can be used as a medicinal and ornamental plant, as well as a source of dyes.

Botanical information

- Family: Amaranths (Amaranthaceae)
- Origin: Central and South America
- Most important cultivation areas: South America, Russia and China
  - Also grown in the Czech Republic, Austria, Poland, the USA and Africa

Morphology

- Morphological characteristics exhibit a high degree of variability due to the large number of different amaranth species
- Annual herbaceous plant that grows to a height of 50-150 cm (up to 2 m)
- Stems are generally branched, leaf and stem colour ranges from green to dark red
- Leaf shape: lanceolate to ovate
- Inflorescence: long main axis with many shorter lateral axes, in different species the inflorescence can be compact or bushy
- The flower clusters contain a single male and many female flowers, which form fruits known as a pyxidium
- Reproduction: Self-fertilized through the wind
- Flowering period: July to September

Varieties and seeds

- Amaranth species are not included in the German Plant Variety Catalogue, and thus there is no formal catalogue of varieties; most work is done with retail or standard seed
- Germinability of many batches 80-90%

PRODUCT DATA SHEET

Climate requirements

- Overall low climate requirements, temperature stands out as an important factor
- Amaranth is a C4 plant and has greater warmth and light requirements than other pseudocereal species
- Amaranth is characterised by effective water use → exhibits good drought tolerance
- Vegetative period lasts 130-150 days, or 120-130 days in Central and Southern Europe

Soil requirements

- Does comparatively well in many soils
- Thrives on sandy loams and soils that are permeable and nutrient-rich, with a pH between 6.0 and 7.5
- Soils with high levels of clay and silt are unfavourable due to the risk of capping in the germination phase
- Amaranth is highly susceptible to soil compaction and capping

Crop rotation

- No particular requirements in terms of prior crops
- In principle, amaranth is self-tolerant, but due to its low competitive vigour against early weeds during establishment,
  consecutive planting is not advised
- Volunteers may emerge in the following crop → amaranth seeds fall down easily during threshing!

Soil preparation

- The aim is to have a well-distributed, even, finely crumbled and weed-free seedbed
- On silty soils, avoid preparing a seedbed that is too fine

Objective	New cultivation
Measures	**Primary soil preparation** on heavy soils, clear by ploughing; in areas with light soil, a cultivator can also be used. **Secondary processing:** Use a mill or rotary harrow for a fine, well-distributed seedbed.

PRODUCT DATA SHEET

Sowing

- Target stand density: 15-25 plants/m²
- Emergence generally occurs about 10-14 days after sowing
- The minimum germination temperature is 12°C, minimum growing temperature 15°C

Crop protection

- Due to its slow early growth, amaranth has a very low competitive vigour against weeds
  - When planting, fields with low weed pressure are preferable
- Early mechanical weed control is essential
  - Careful harrowing is recommended between the 3-leaf and 4-leaf stages
- To date, there is no authorised herbicide for amaranth
- Indirect weed prevention measures include: choosing the right crop rotation, using weed-free seed with high germinability, and high sowing density
- The larvae of moths (e.g. Agrostis sp.) and insects (e.g. Lygus sp.) are the most significant pests
  - Insecticides can be used (only approved formulations!)
- Common diseases:
  - During germination: Pythium, Rhizoctonia and Fusarium species
  - In later developmental stages: Phomopsis, Botrytis, Cercosporella and Phoma species
  - On leaves: Peronospora sp.
- Diseases can only be controlled to a limited extent
  - No fungicides have been approved in Germany for use on grain amaranth
  - Well-designed, varied and diverse crop rotation is an effective measure against fungal diseases

PRODUCT DATA SHEET

Fertilisation

	Total N	P_2O_5	K_2O	MgO
Total	80-100	60-80	130	15-20

- Amaranth produces 10,000-12,000 kg/ha of harvest residues → to bear in mind for the next crop's nutrient balance!

Harvest and treatment

- Optimal harvest time is very hard to determine due to uneven ripening
- If sown in May, the harvest window generally stretches from early September to mid-October
- The general recommendation is to start harvesting when around 50-70% of the fruits have turned brown
  - Grain moisture ranges from 20% to 30%
- Seeds can be threshed using a conventional thresher
  - Grain yield range: 700-1,200 kg/ha
- It is recommended to dry to 10-12% residual moisture

Redroot amaranth (Amaranthus retroflexus)

Love-lies-bleeding (Amaranthus caudatus)

Any questions? Please feel free to contact us!
+49 2151 - 44 17 0
info@freudenberger.net