

MAXYIELD APPLICATION PROTOCOL FOR SORGHUM

Professional Soil Improvement & Nutrition Program

Crop: Sorghum (*Sorghum bicolor*)

Product: Maxyield Organic Soil Conditioner (Humic Acid Granule)

1. Before Planting

Soil Testing

Test the soil before planting to determine pH and nutrient status. Sorghum performs best where soil acidity is controlled and nutrient availability is balanced. Soil test results should guide fertilizer and any required soil-correction programme.

Land Preparation

Prepare a fine, firm and well-drained seedbed suitable for uniform germination and root establishment. The production protocol supplied for sorghum also emphasizes soil testing, fine seedbed preparation and input planning before planting.

2. Planting Application

Recommended Rate

Maxyield: 10 kg per hectare at planting.

Application Method

Apply Maxyield together with the normal basal fertilizer programme at planting. Maxyield may be blended uniformly with the mineral fertilizer immediately before application, or applied in the same operation where practical. Avoid concentrated direct contact between fertilizer salts and seed; follow the normal placement practice for the fertilizer being used.

The reference sorghum production programme uses basal fertilizer at planting and identifies early crop establishment as a key management stage. Maxyield is intended to complement, not replace, the crop nutrition programme.

3. Topdressing Application

Recommended Rate

Maxyield: 10 kg per hectare at topdressing.

Timing

Apply with the normal topdressing operation during active vegetative growth. As a general guide, the reference production programme places topdressing around the V3-V5 stage, within approximately 24-35 days after planting, depending on variety, climate and crop development.

Application Method

Blend Maxyield uniformly with the selected topdressing fertilizer immediately before field application, or distribute it evenly in the same application zone. Apply when adequate soil moisture is available or before expected rainfall/irrigation so that the product can move into the active root zone.

4. Benefits of Maxyield in Sorghum

- Improves soil structure and aeration.
- Increases soil moisture retention and supports the crop during short periods of moisture stress.
- Enhances nutrient availability and nutrient use efficiency.
- Promotes vigorous root development and early crop establishment.
- Supports soil biological activity and balanced soil conditions.
- Supports efficient nutrient uptake during rapid vegetative growth.
- Helps support panicle development, grain filling and yield potential when used as part of a balanced crop nutrition programme.

5. Optimal Soil pH for Sorghum

Sorghum is adaptable, but optimum production is generally achieved in slightly acidic to near-neutral soil. A practical target range is pH 6.0-6.5. Soil pH below about 5.5 can restrict nutrient availability and root performance, while strongly alkaline conditions can reduce the availability of micronutrients, particularly iron.

Soil Condition	pH Range	Agronomic Interpretation
Optimal	6.0-6.5	Best target range for nutrient availability and high yield potential.
Generally suitable	5.5-7.5	Sorghum can perform well, subject to soil type, variety and nutrient management.
Below optimum	<5.5	Increasing risk of acidity-related nutrient limitations and yield reduction.
Strongly acidic	<5.0	High risk of substantial growth and yield penalty; soil correction should be considered from soil-test recommendations.
High / alkaline	>7.5	Increasing risk of micronutrient limitations; iron chlorosis becomes a particular concern at very high pH.

Indicative Yield Loss Associated with Soil pH

The table below is an evidence-based indication rather than a universal prediction. Long-term Kansas State grain-sorghum trials measured the following average yields at different soil pH levels. Yield loss is calculated here relative to the highest observed yield in that trial series (99.3 bu/acre at pH 6.7). Actual losses will vary with soil, hybrid, rainfall, fertility and other stresses.

Measured Soil pH	Average Grain Yield (bu/ac)	Relative Yield	Indicative Yield Loss
5.2	83.8	84.4%	15.6%
5.5	89.9	90.5%	9.5%
6.3	96.3	97.0%	3.0%
6.7	99.3	100.0%	0.0%
7.2	99.0	99.7%	0.3%

Interpretation: in this multi-year dataset, pH 5.2 was associated with approximately 15.6% lower grain yield than the best-performing pH treatment, while pH 5.5 was approximately 9.5% lower. Yield was close to maximum from pH 6.3 to 7.2. These figures should not be presented as guaranteed losses for every farm; they are a practical illustration of the production risk associated with sub-optimal acidity.

6. Standard Application Program

Growth Stage	Maxyield Rate	Application Guidance
Planting	10 kg/ha	Apply with the normal basal fertilizer programme.
Topdressing / active vegetative growth	10 kg/ha	Apply with the normal topdressing fertilizer programme, typically around V3-V5 depending on crop development.
Total standard programme	20 kg/ha per crop cycle	Two applications: planting + topdressing.

Maxyield should be used as part of an integrated soil fertility programme. Fertilizer rates, liming and other soil amendments should follow soil-test results, local agronomic recommendations and the nutrient requirements of the selected sorghum variety.

7. Crop Management Considerations

The supplied sorghum production protocol identifies the V4-V6 vegetative stage as a period when adequate water and nutrients are important, V7-V9 as a period of peak nutrient uptake, and flowering as a critical stage where water or nutrient stress should be avoided. The Maxyield programme should therefore be integrated with timely fertilizer, weed, pest, disease and moisture management rather than used as a substitute for these practices.

Technical Basis

- Ken & Tech Limited: standard Maxyield programme specified for this protocol - 10 kg/ha at planting and 10 kg/ha at topdressing.
- Sorghum Production Protocol (Raphael Lesian, KWS/Agventure Seeds): soil testing, basal fertilizer, crop growth stages and topdressing timing.
- Kansas State University Agricultural Research: Effect of Soil pH on Crop Yield - multi-year grain sorghum yield response across pH treatments.
- Oregon State University Extension and Virginia Tech Extension: sorghum production is optimized around pH 6.0-6.5; acidic soils below approximately pH 5.5 require particular attention.