



MAIZE HEAT UNITS – DECEMBER 2023

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Maize is a sub-tropical plant that requires a specific amount of heat units to mature. Therefore we need to grow the right varieties to ensure harvest is on time.

What are maize heat units?

Maize heat units (MHUs) are a measure of the accumulated heat energy that a maize plant needs to complete its life cycle. MHUs are calculated using the following formula:

$$\text{MHU} = (\text{Average daily temperature} - \text{Base temperature}) * \text{Number of days}$$

The base temperature for maize is 10°C. This means that MHUs are only accumulated when the average daily temperature is above 10°C.

Why are maize heat units important?

Maize heat units are important because they can be used to determine the following:

- The suitability of a particular location for growing maize
- The best time to plant maize
- The expected maturity date of a particular maize variety
- The potential yield of a maize crop

How to calculate maize heat units:

To calculate maize heat units, you need to know the average daily temperature and the base temperature of 10°C.

To calculate the average daily temperature, add the daily high and low temperatures and divide by two. For example, if the daily high temperature is 25°C and the daily low temperature is 15°C, the average daily temperature would be 20°C.

Once you have the average daily temperature and the base temperature,

you can calculate maize heat units using the following formula:

$$\text{MHU} = (\text{Average daily temperature} - \text{Base temperature}) * \text{Number of days}$$

For example, if the average daily temperature is 20°C and the base temperature is 10°C, then 10 MHUs will be accumulated daily.

Maize heat unit requirements for different stages of growth:

Maize heat unit requirements vary depending on the stage of growth. The following table shows the approximate MHU requirements for different stages of maize growth:

Stage of growth	MHU requirements
Germination	50-75
Emergence	100-125
V6 (six fully emerged leaves)	400-500
VT (tassel emergence)	900-1000
R1 (silking)	1300-1400
R3 (milk stage)	1700-1800
R5 (dough stage)	2100-2200
R6 (mature dent stage)	2500-2600

Using maize heat units to select a maize variety:

When selecting a maize variety, choosing one suited to your area's climate is important. The best way to do this is to choose a variety with MHU requirements matching your area's average MHU accumulation.

You can find information on the average MHU accumulation in your area by visiting maize breeder websites, which use a postcode tool to find your exact heat units.

Factors that affect maize heat unit accumulation:

The following factors can affect maize heat unit accumulation:

- Temperature: The higher the temperature, the faster MHUs will accumulate.
- Day length: Longer days result in more MHU accumulation.
- Cloud cover: Cloudy days result in less MHU accumulation.
- Elevation: Higher elevations have lower temperatures, which results in less MHU accumulation.
- Soil type: Sandy soils warm up more quickly than clay soils, which results in more MHU accumulation.

Managing maize heat units:

There are a few things that you can do to manage maize heat units, including:

- Planting at the optimal time: Planting at the optimal time will help ensure that maize plants accumulate MHUs quickly, subject to correct soil temperature and conditions.
- Selecting a maize variety with the appropriate MHU requirements: Choosing a maize variety with

MHU requirements that matches the average MHU accumulation in your area will help to ensure that maize plants have enough MHUs to reach maturity (30% DM).

- Using irrigation: Irrigation can help to reduce the stress on maize plants during drought conditions.
- Applying the correct amount of nutrition: Optimum nutrition will help improve maize plants' growth and increase their MHU accumulation.

Heat units conclusion:

Maize heat units are an important tool for maize growers. By understanding MHU requirements, growers can select the right maize variety for their area and plant at the optimal time.

Choosing the correct variety:

Maize varieties are categorised into different maturity groups based on the heat units required to mature. The maturity groups range from very early (FAO 140-180) to very late (FAO 260+). Early-maturing varieties are suitable for areas with short growing seasons, while late-maturing varieties are better suited for areas with longer growing seasons and lighter soils.

The FAO number is a standardised maturity index for maize varieties. It is based on the number of heat units required for the maize to reach maturity and other factors, such as the timing of silking and grain maturity. The higher the FAO number, the longer the maturity period and the higher the heat requirement.

When selecting a maize variety, it is important to consider the FAO number, the maturity group, and the local growing conditions. The right variety will ensure

that the maize matures properly and produces a good yield.

For example, an FAO number of 200 corresponds to a maize variety that requires approximately 2,750 to 2,900 heat units to mature.

Here is a table of the approximate number of heat units required for different maize maturity groups:

Maturity Group Class	FAO Number	Heat Units Required
Very Early	140-180	2,500-2,750
Early	180-200	2,750-2,900
Mid-Season	200-230	2,900-3,150
Late	230-260	3,150-3,400
Very Late	260-290	3,400-3,650

It is important to note that these are just estimates, and the actual number of heat units required will vary depending on the specific variety of maize and the local growing conditions.

Some other factors that can affect the number of heat units required for maize to mature are below:

- Temperature: The higher the average temperature, the fewer heat units are required.

- Day length: Maize is a day-length sensitive crop, and longer day lengths can promote faster growth.
- Soil moisture: Maize requires adequate soil moisture to grow properly.
- Nutrient availability: To grow properly, maize requires essential nutrients such as nitrogen, phosphorus, and potassium.
- Disease and pest pressure: Disease and pest pressure can stress the maize plant and reduce its growth rate.

By carefully managing these factors, you can help ensure that the maize crop receives the right heat units and matures properly.