

# Response of Dual-Purpose Sorghum varieties to Fertilization and Sowing Date in Mali's Sudanian Zone

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## Introduction

- Sorghum is an important traditional cereal crop grown worldwide.
- Smallholder farmers in the drylands of Africa consumed its grains and used its fodder for animals feed.
- Low soil fertility, limited use of fertilizer and erratic rainfall distribution are the major constraints to sorghum productivity.
- Identifying synergy between suitable management practices (sowing time and fertilizer strategy) that are already known by smallholder farmers will help reducing the risk of yield loss in the face of climate change and thus increase production.



Figure 1 – Sorghum Panicle for Soubatimi (a) and Peke (b) varieties

## Methodology

- Two experiments were conducted under rainfed condition in years 2019 and 2020 at ICRISAT-Mali research station.
- Experiments were laid out in a split-split-plot design with 3 replications. Fertilizer types were assigned to the main plots, sowing dates to the sub-plots and varieties to the sub-sub-plots. Two dual-purpose sorghum varieties responses to sowing and fertilizer strategies were evaluated: Peke and Soubatimi.
- In each year daily weather records as well as plant phenological stages and the final grain and biomass yield were recorded.
- Analysis of variance (ANOVA) was run to assess the interaction between sowing dates and fertilizer types

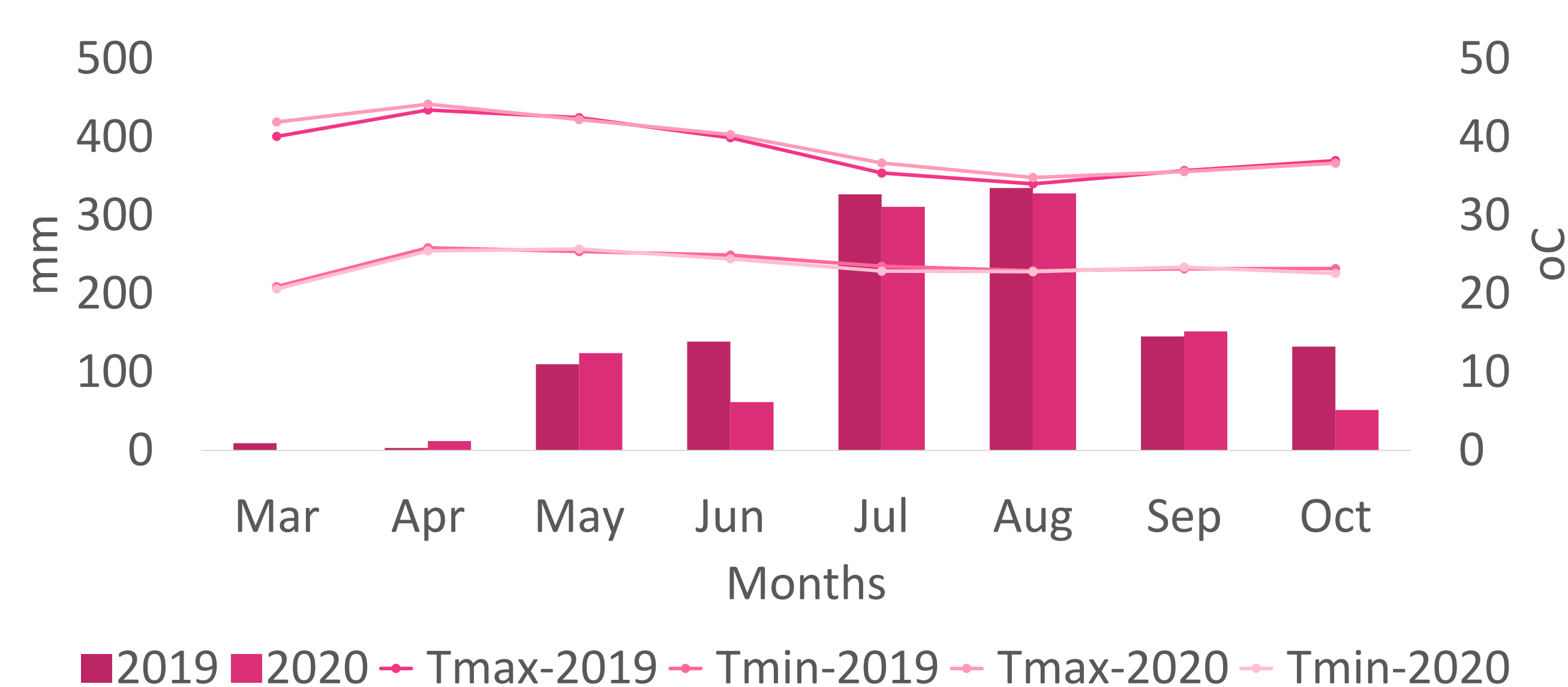


Figure 2. Total monthly rainfall and average monthly mini. & maxi temperature of Samanko for 2019 and 2020

## Results

In 2019, higher yield of Peke and Soubatimi was observed under organic and inorganic fertilizer respectively. In 2020, higher yield of Peke was observed either under organic or inorganic fertilizer while that of Soubatimi was observed under organic+inorganic. In 2019 an increase in yield with late sowing for both genotypes was observed, the reverse was observed in 2020.

Table 1 shows a significant interaction of sowing dates and fertilizer types tested on the agronomic performance of both varieties ( $p \leq 0.05$ ). The highest yield for Peke was observed under organic fertilizer with late sowing while that of Soubatimi was observed under inorganic+organic fertilizer with early sowing. The higher yield of Peke with late sowing could be explained by birds attacks of early and medium sowing plants.

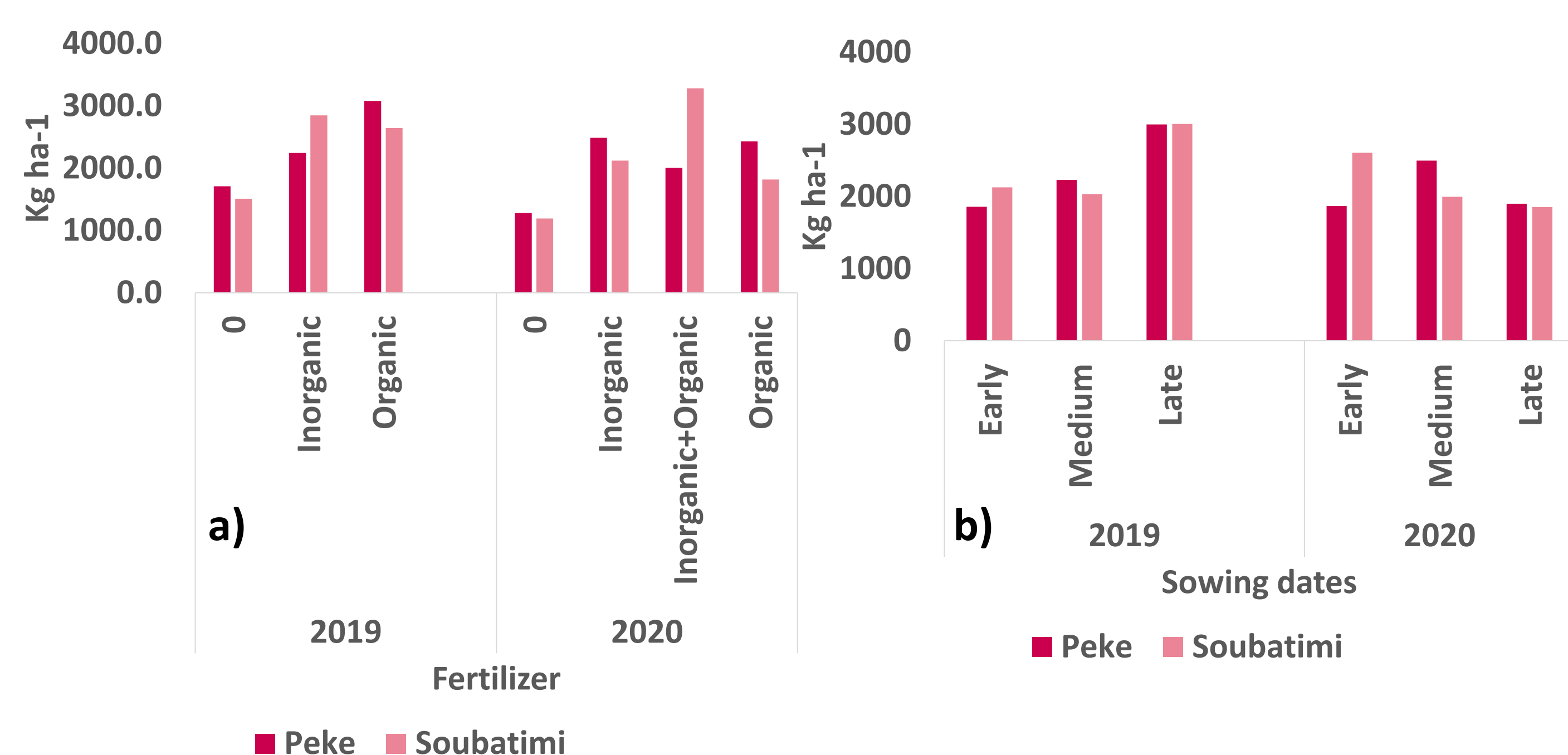


Figure 3. Grain yield of Peke and Soubatimi grown in 2019 and 2020 under a) different fertilizer types, b) different sowing strategies

Table 1. Grain yield (kg ha<sup>-1</sup>) of Peke and Soubatimi sown early (DS1), medium (DS2) and late (DS3) under 3-4 fertilizer treatments in 2019 and 2020

Fertilizer types	DS1		DS2		DS3	
	Peke	Soubatimi	Peke	Soubatimi	Peke	Soubatimi
<b>2019</b>						
0	1182.7	1378.5	1990.1	1491.3	2044.7	1726.3
Inorganic	2135.4	2436.1	1972.4	2005.0	2620.2	4096.4
Organic	2254.5	2565.1	2651.7	2603.2	4329.5	2765.4
<b>2020</b>						
0	1311.9	1511.1	1521.0	869.1	711.1	1352.2
Inorganic	2338.6	2448.0	2826.7	1794.7	2196.7	1796.3
Inorganic+organic	1890.5	4101.3	2316.0	3337.6	1804.7	2406.3
Organic	1923.7	1997.9	2997.1	1770.4	2337.4	1666.3
<b>Interaction</b>						
FertilizerxSowing dates	ns		ns		ns	
FertilizerxSowing datesxVarieties	*		*		*	
FertilizerxSowing datesxVarietiesxYears	ns		ns		ns	

\* mean significant different at  $p \leq 0.05$ ; ns: not significant

## Conclusion

This study shows synergy between early sowing and organic+inorganic fertilizer for Soubatimi and late sowing and either organic or inorganic fertilizer for Peke. The higher yield observed when sown late was due to birds attacks of early and medium sowing plants. These results will be used in crop simulation models for further exploration.

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