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Advances in groundnut (*Arachis hypogaea* L.) breeding for resilient cropping systems in Burkina Faso

Introduction

Improved groundnut varieties have been introduced from ICRISAT Mali in 2013 and evaluated during three (3) years on the experimental station of Gampela in Burkina Faso.

Objective : Compare the pods and haulm yields of two (2) varieties tolerant to foliar diseases, three (3) varieties tolerant to aflatoxins et two (2) varieties (one improved and one local) tolerant to drought to two (2) varieties released in Burkina Faso.

Results

Yields of two varieties tolerant to foliar diseases compared to two varieties released in Burkina Faso

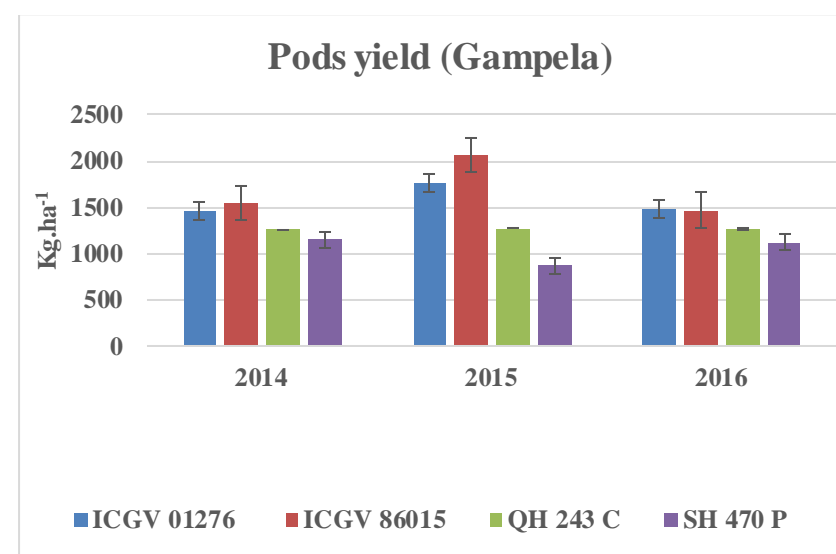


Fig.1: Pods yield
During the three (3) years, there is a significant difference between the varieties ($p < 0.001$). ICGV 86015 has the best mean pods yield ($1694.2 \text{ kg}\cdot\text{ha}^{-1}$) followed by ICGV 01276 ($1571.6 \text{ kg}\cdot\text{ha}^{-1}$). QH 243 C ($1267.5 \text{ kg}\cdot\text{ha}^{-1}$) has a pods yield higher than SH 470 P ($1049.9 \text{ kg}\cdot\text{ha}^{-1}$).

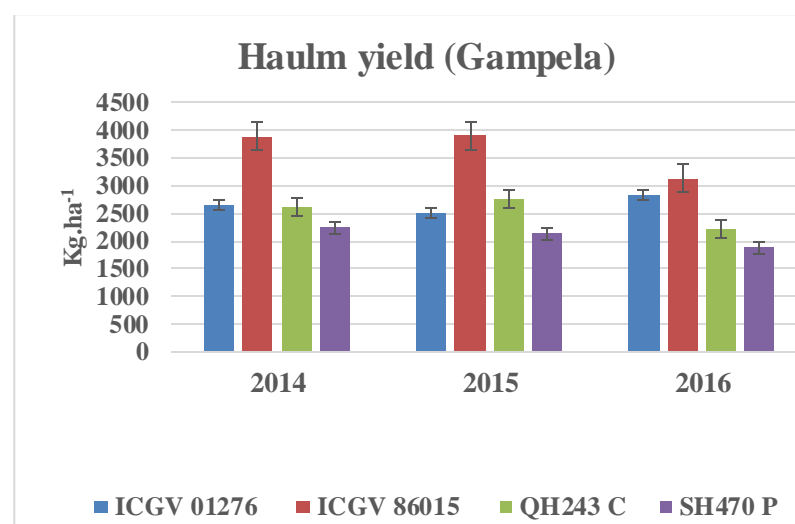
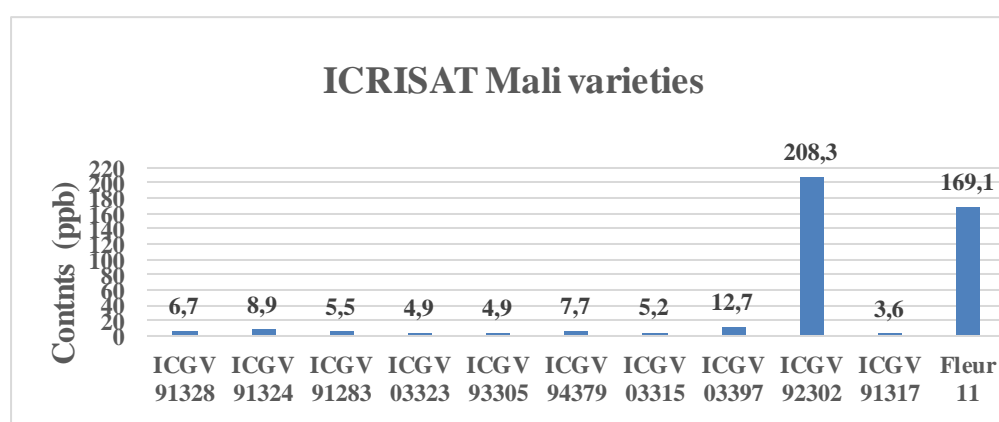


Fig. 2: Haulm yield
Concerning haulm yield, there is also a significant difference ($p < 0.01$) between the varieties. ICGV 86015 has again the best haulm yield ($3641 \text{ kg}\cdot\text{ha}^{-1}$) followed by ICGV01276 ($2659.7 \text{ kg}\cdot\text{ha}^{-1}$) and QH 243C ($2526.5 \text{ kg}\cdot\text{ha}^{-1}$). SH 470 P has the lowest yield ($2085.8 \text{ kg}\cdot\text{ha}^{-1}$).



These varieties have been analyzed by the method ELISA Test of ROMERLABS. We used the Kit AgraQuant 1-20 ppb and the Reader "STAT FAX 303" for quantification of aflatoxins. ICGV 91328, ICGV 91283, ICGV03323, ICGV 93305, ICGV 03315 and ICGV 91317 have the lowest contents of aflatoxins. These analysis permitted us to choose and use some varieties in our trials like tolerant varieties to aflatoxins

Fig.3: Contents of aflatoxins of varieties introduced from ICRISAT Mali and Fleur 11

Yields of varieties tolerant to aflatoxins compared to two varieties released in Burkina Faso

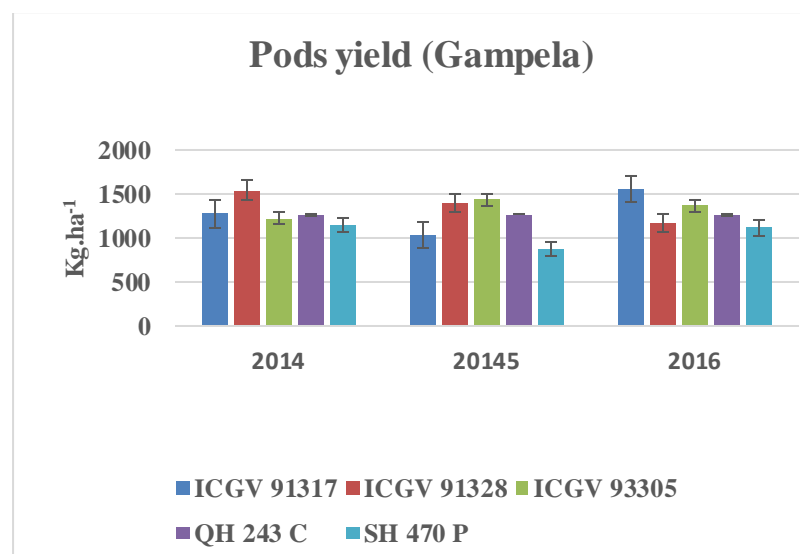


Fig.4: Pods yield
We observe a statistical difference between the varieties ($p < 0.01$) during the three years. ICGV 91328 and ICGV 93305 have the highest pods yield (respectively $1372.8 \text{ kg}\cdot\text{ha}^{-1}$ and $1344.5 \text{ kg}\cdot\text{ha}^{-1}$) followed by ICGV 91317 ($1291.7 \text{ kg}\cdot\text{ha}^{-1}$) and QH 243C ($1267.5 \text{ kg}\cdot\text{ha}^{-1}$). SH 470P has the lowest pods yield ($1049.9 \text{ kg}\cdot\text{ha}^{-1}$).

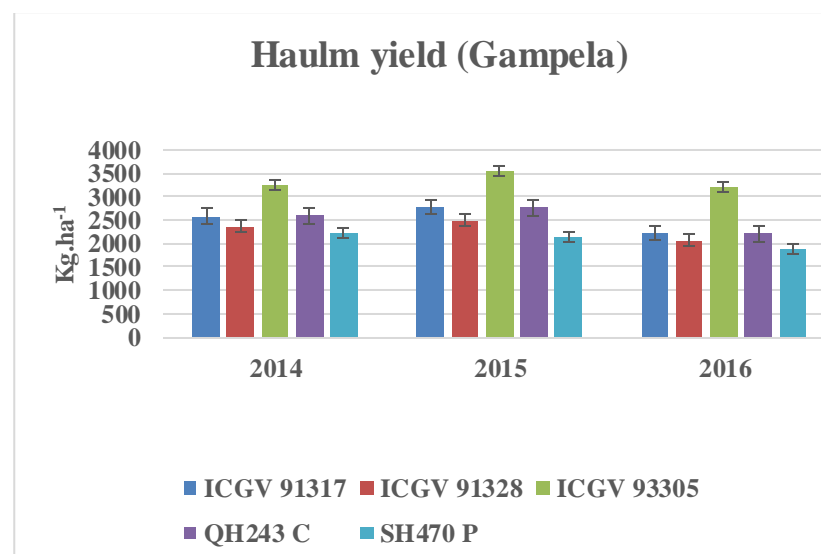


Fig.5: Haulm yield
The haulm yield of the varieties differ statistically from one variety to another one ($p < 0.01$). ICGV 93305 has the highest haulm yield ($3345.3 \text{ kg}\cdot\text{ha}^{-1}$) followed by ICGV 91317 ($2533.3 \text{ kg}\cdot\text{ha}^{-1}$) and QH 243C ($2526.5 \text{ kg}\cdot\text{ha}^{-1}$). ICGV 91328 and SH 470P have the lowest haulm yield (respectively $2301.4 \text{ kg}\cdot\text{ha}^{-1}$ and $2085.8 \text{ kg}\cdot\text{ha}^{-1}$).

Yields of varieties tolerant to drought compared to two varieties released in Burkina Faso

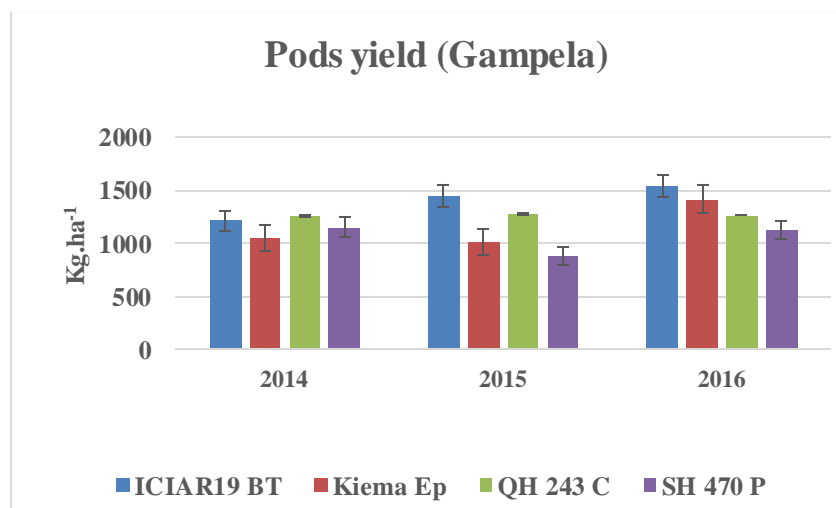


Fig.6: Pods yield
The pods yields of the varieties differ statistically ($p = 0.19$), ICIAR 19 BT ($1399.7 \text{ kg}\cdot\text{ha}^{-1}$) and QH 243C ($1267.5 \text{ kg}\cdot\text{ha}^{-1}$) have the best pods yield followed by Kiema ($1156.8 \text{ kg}\cdot\text{ha}^{-1}$).

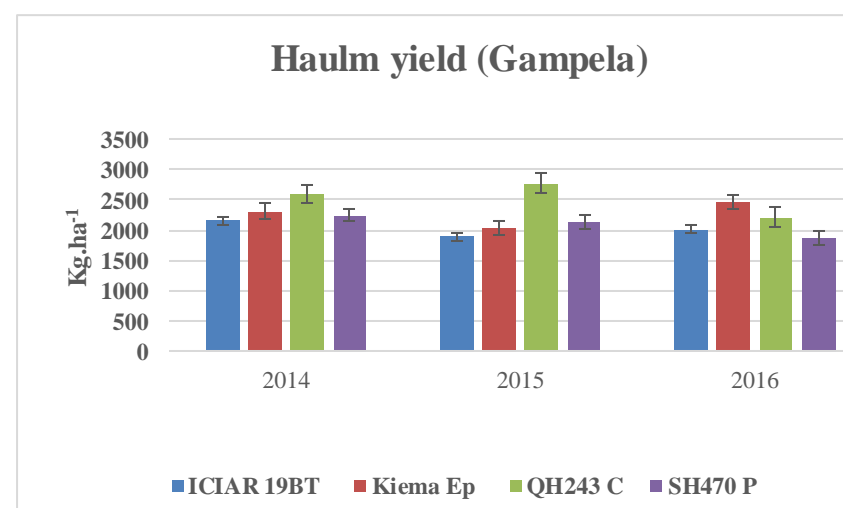


Fig.7: Haulm yield
QH 243C and Kiema have the highest haulm yield (respectively $2526.5 \text{ kg}\cdot\text{ha}^{-1}$ and $2270.8 \text{ kg}\cdot\text{ha}^{-1}$). ICIAR 19 BT and SH 470P have the lowest yield ($2019.6 \text{ kg}\cdot\text{ha}^{-1}$ and $2085.8 \text{ kg}\cdot\text{ha}^{-1}$). ($p = 0.28$).

Discussion

During the three years, there were statistical differences between varieties for both the pods and the haulm yields. The yields of introduced varieties are superior to those of released varieties excepted for the drought tolerant varieties where QH 243C has the best haulm yield. ICGV 86015 has both interesting pods and haulm yield ($1694.2 \text{ kg}\cdot\text{ha}^{-1}$ and $3641 \text{ kg}\cdot\text{ha}^{-1}$) followed by ICGV 93305 ($1344.5 \text{ kg}\cdot\text{ha}^{-1}$ and $3345 \text{ kg}\cdot\text{ha}^{-1}$). These interesting results obtained are similar to those observed at the small stakeholders' level who follow recommended practices including optimal crop density and planting time and then they benefit from the yields improvements.

Acknowledgments:

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