

SEED COAT FRAGMENTS, A MAJOR SOURCE OF COTTON YARN IMPERFECTIONS

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Introduction

Seed coat fragments (SCF) are “portions of a cotton seed, usually black or dark brown in color, broken from mature or immature seed, and to which fibers and linters may be or may not be attached. Seed coat fragments are distinct from other imperfections found in cotton, such as neps, motes, leaf trash and pieces of stem...” (ASTM, 1975).

SCF are caused by the breakage of the seed-coat during the ginning process (separation of cotton fibers from seed). SCF reduce the efficiency of cleaning, increase breakage during spinning (Price, 1987) and affect the fabric appearance. Our study was performed to check out the effect of SCF on cotton yarn quality using different SCF detection and counting methods.

Materials and Methods

Fifteen non-sticky cottons representative of a broad range of SCF contents were ring spun (RS) and open-end spun (OE) to 20 tex yarn. The SCF in the card web were counted by Trashcam, an image analysis method developed in CIRAD (Gourlot *et al.*, 1995).

SCF in the yarn were counted by a capacitive-sensor evenness tester (UT3, Zellweger-Uster) based on a detailed analysis of neppiness (Frydrych, 1989). The detailed analysis allows the classification of yarn imperfections (neps : 200 % for RS, and 280 % for OE) into different types fiber neps (figure 1), SCF (figure 2) and other neps (figure 3).

Results and Discussion

RS Yarn

The results of detailed analysis for RS yarn are shown on figure 4. A majority of neps examined for the cottons tested were SCF (nearly 75 %). This result would be different in case of sticky cotton (Frydrych, 1996).

OE Yarn

Figure 5 shows the results of detailed analysis of OE yarn neppiness. Nearly 59 % of total neps are SCF. The impact

of the SCF on OE yarn neppiness (at a 280% threshold), is less important than for RS yarn. This is due to SCF elimination and/or fragmentation performed by the opener during fiber individualization in OE process.

For both OE and RS yarn, we noticed a highly significant relationship (figure 6) between SCF counted on card web and an other type of yarn imperfections distinct from neps : thick places. SCF may be also a source of thick places on yarn.

Conclusion

SCF are the main source of neps for non-sticky cotton in both RS and OE spinning processes. However, the impact of this contaminant on RS yarn is more important than for OE yarn due to SCF elimination and fragmentation by the opener. SCF may also induce thick places in yarn. A study is being performed in CIRAD to identify with precision the kind of imperfections and the mechanism of structure perturbation caused by SCF in the yarn.

References

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Figure 1

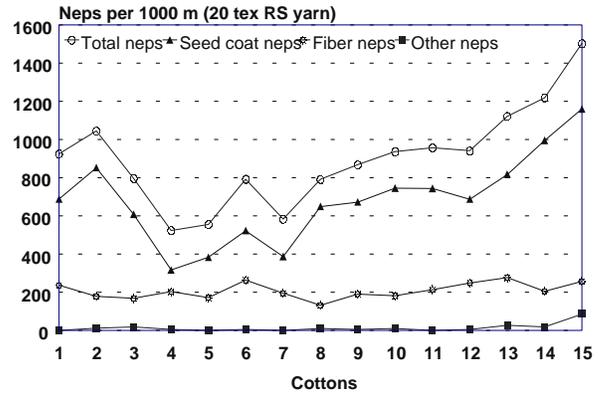


Figure 4



Figure 2

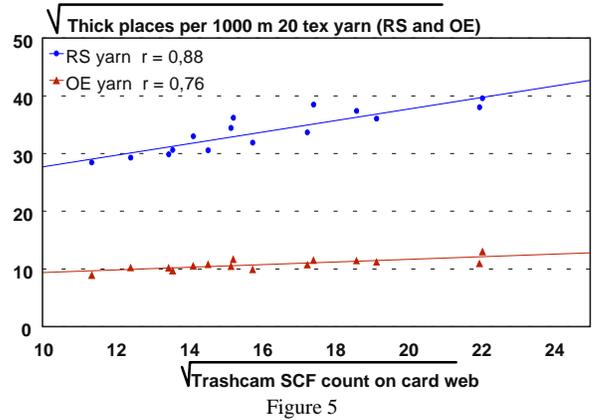


Figure 5

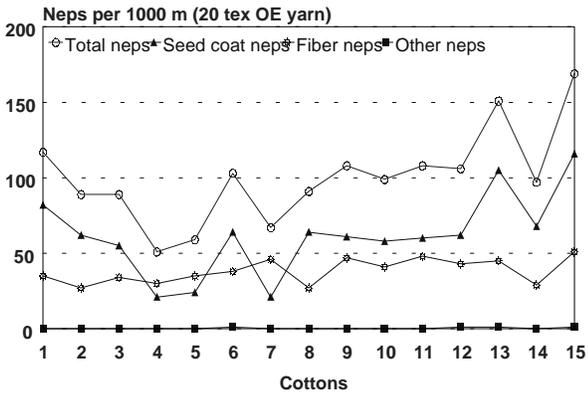


Figure 3