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Improving sink regulation as a promising option to increase yield potential

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Increase in yield potential in rice has been lately converted in developing genotypes with larger sink size, i.e. bigger and more compact panicles. Incidentally, filling efficiency of such genotypes is lower than that of check varieties. Alternatively, better sink regulation has been recognized as a way to improve grain yield. Sink regulation can be defined as the timing at which the plant switch on/off sinks and reinforce/reduce active sinks, where main sinks are leaves and roots at vegetative, internodes, panicles and reserves at reproductive, and spikelets at grain filling. At vegetative, early tiller production is essential to establish quick leaf area coverage, and significant reduction in grain yield is measured in case tillering is delayed by late transplanting or transient stressed conditions. In addition, earlier cessation of tiller production has been reported as a key process to promote larger panicle size (*qTSN4* QTL) and higher resource remobilisation during grain filling (hybrid rice). At later stage, positive correlations between grain yield and filling efficiency (as long as genotypes with the same potential sink size are compared) highlights that increasing filling efficiency is a promising option. The higher compactness of the panicles of newly bred genotypes exacerbates the internal competition between spikelets and reduces filling efficiency. Indeed, the dominant effect of the apical above basal spikelets is more detrimental in compact panicles where higher ethylene concentration in basal and secondary spikelets reduce starch formation. Would any diversity in panicle architecture or peduncle section reduce internal competition and increase filling efficiency?

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