6. Morphological traits and grain yield performance of rice varieties

In all 100 rice varieties released for different ecosystems (Table 1) were raised in plots as described in Materials and Methods and periodical observations on various morphological traits were recorded during three kharif seasons (Table 12) and two rabi seasons (Table 13) and pooled to present overall data for the both kharif and rabi seasons (Table 14).

In kharif, plant height was more than a meter in Ajaya, Narmada, PR111, Mahsuri. Eriemaphou, Puduvaiponni, Mandya Vijaya and Tulasi. But in rabi season plant height was low in all but Eriemaphou, Vasumati, Akutphou, Mandya Vijaya. A deep water variety Dinesh was only 24 cm tall.

In kharif, Palghar1, Cottondora Sannalu, Vajram, IR36, TKM9, Aiswarya, Swarnaprabha, Deepti, Akutphou, ASD16, ADT44, Dinesh and PR115 showed more than 30 tillers with panicle per hill. In rabi, Taraori Basmati, PR111, PR113, Arvindar, Sarjoo52, IR36, IR50, GR4, Cottondora Sannalu, Subramanyabharati, ASD20, Tellahamsa, and Aditya had only 12-13 tillers with panicles per hill.

In kharif, 30 varieties viz., Suraksha, Kharveli, Narendra118, IR72, Mahsuri, GR4, Sarjoo52, PR111, IR64, Swarnamuki, Athira, Aiswarya, Lalat, Punidavati, Surendra, Tulasi, Karjat3, HKR126, PR115, PR113, Salivahana, Narendra97, Narmada, Subramanyabharati, Sabita, Narendra359, Gurjari, IR64, Swarnadhan and Swarna
possessed more than 100 g grains weight per 10 hills. But in rabi, 73 varieties were with more than 100 g grains weight per 10 hills: 55 varieties viz., Suraksha, Aditya, Puduvaiponni, Prasanna, Govind, Ratna, PR111, Surendra, Swarnaprabha, Amulya, Karjat184, Deepti, ADT36, GR101, Aravindar, Vijetha, Bharatidhasan, Mahsuri, Aiswarya, Narendra80, Punidavati, Khitish, Krishnahamsa, Mandya Vijaya, Narendra118, Rasi, Jyothi, Nidhi, Subramanyabharati, Jaya, PR114, GR3, Triguna, Swarnadhan, HKR126, Sonasali, Kanchana, IR72, Co47, Phouoibi, GR4, HKR120, ADT44, Vibhava, Bharani, Tellahamsa, Cottondora Sannalu, Manasarovar, Lalat, Tulasi, PR113, ASD6, IR64, Ajaya and HKR46 registered more than 100 g grains weight per 10 hills; and 16 other showed more than 130 g grains weight per 10 hills that included Prabhat, Narendra359, Swarnamuki, Sarjoo52, Narmada, ASD20, PR115, Karjat3, Salivahana, PR116, Athira, IR50, Gurjari, Thapachini, Vikramarya and CO48.

In kharif panicle weight per hill was more than 16 g panicle weight per hill in 16 varieties viz., Prasanna, Puduvaiponni, Prabhat, GR5, Narendra359, Swarna, Tellahamsa, ASD18, Nidhi, ASD16, IR64, TKM9, Ajaya, Narendra118, Phouoibi and PR114. However, in rabi, 23 varieties showed more than 16 g panicle weight per hill. These included Nidhi, Vibhava, Swarnamuki, PR114, Salivahana, Jaya, Phouoibi, Manasarovar, Thapachini, Tulasi, Aditya, Tellahamsa, HKR126, Narmada, Surendra, Sonasali, Triguna, Subramanyabharati, Prabhat, HKR46, Co48, Vikramarya and Gurjari.

The straw weight in kharif was more than 40 g/hill in 6 varieties - Swarnaprabha, ASD18, GR5, ASD16, Narendra118 and Co48. In rabi, straw weight remained low (less
that 12 g/hill); and at 15-16 g/hill in Swarnamuki, Subramanyabharati, Deepti, GR11, Mandya Vijaya, Sarjoo52, IR36, ADT44, PR106 and Puduvaiponni.

In kharif, 16 varieties viz., HKR120, Narendra359, Subramanyabharati, Narmada, Kasturi, Ratna, Sonasali, Ajaya, Amulya, Swarna, Swarnamuki, Puduvaiponni, Manasarovar, PR115, Arvindar and Mahsuri showed > 70 grains/panicle, while Nidhi and Mandya Vijaya Registered >100 grains/panicle. However, In rabi, ASD16, Narmada, Swarnadhan, Puduvaiponni, GR11, Salivahana, Sonasali, Mahsuri, GR4, IR50, Mandya Vijaya and Nidhi were with 71-84 grains/panicle.

In kharif, the chaff spikelets were between 40 to 65/panicle in Prabhat, Thapachini, ASD16, Karjat4, ADT44, Co48 and Pratibha. In rabi, however, only in GR11, Mahsuri and GR4 it was 40-46 and in the rest it remained below 33 chaff/panicle.

The mean grain weight estimated was more than 5.0 tonnes/ha in eight varieties in kharif viz., Puduvaiponni, IR64, Ajaya, Narendra359, Narendra118, Swarna, Phouoibi and PR114; and in 12 varieties in rabi viz., Tulasi, Athira, Tellahamsa, IR50, Salivahana, Prabhat, HKR46, Narmada, Thapachini, Gurjari, Vikramarya and Co48,

Irrespective of seasons, only three varieties, Vasumati, Eriemaphou and Mandya Vijaya were more than one meter tall. Likewise PR115, CO48 and Dinesh had 30-43 tillers with panicles/hill. Vikramarya, IR64 and Gurjari were with 131-141 g grains/10 hills. Prabhat, Tellahamsa, Vikramarya, Co48, Arvindar, Phouoibi, PR114 and TKM9
showed 17 to 26 g panicle wt/hill. Swarnaprabha, ASD18, ADT36, ASD16 and CO48 recorded 28-37 g straw weight/hill. Mahsuri, Mandya Vijaya and Nidhi possessed 90-113 grains/panicle. PR116, ADT44, Karjat4, Co48 and Pratibha showed 35-65 chaff/panicle.

The overall means indicated that the expression of several morphological traits was at higher levels in kharif seasons than in rabi seasons. These traits were tiller/hill (no), tillers with panicle/hill (no), chaff/10 hills (wt.), straw/hill (wt.), grain and chaff/panicle (wt.), grains/panicle (No.) and chaff/panicle (No.). Such increases in tillers, straw and chaff waste the energy and bring down the grain yield harvests.

In rabi seasons, however, only the four important traits viz., plant height (cm), grains/10 hills (wt.), panicle/hill (wt.) and grains/panicle (wt.) that contribute to yield in a variety were expressed at higher levels than other morphological characters. Such increases in yield related traits resulted in increased yields of 622, 555 and 588 kg/ha calculated based on grains/10 hills (wt.), panicle/hill (wt.) and overall mean grain yields, respectively.

The standard error and standard deviation derived for kharif and rabi seasons indicated the high level of precision of the estimated made on various morphological traits in varieties released for different ecosystems. The coefficients of variation calculated for the expression of various morphological traits in kharif seasons were higher than those estimated in rabi seasons. These differences in coefficients of variation were however low for grain yield estimated in varieties indicating their stability.