Perennial Growth and Agronomic Traits of Rice

In Southeast Asia, upland rice (Oryza sativa L.) is farmed extensively on hilly slopes without terraces or flooded paddies, raising concerns about soil erosion and degradation of watersheds. If perennial rice cultivars were developed, they could help reduce soil erosion from upland rice fields. In a two-part series, Sacks et al. (p. 120–128 and 129–134) evaluated perennial growth and agronomic traits for interspecific progeny derived from cultivated rice \( \times \) two perennial wild relatives (O. rufipogon Griff. and O. longistaminata A. Chev. et Roehr.). Unlike the upland cultivars, some interspecific progeny were strongly perennial. Progenies derived from O. rufipogon were generally fully fertile but progenies of O. longistaminata were usually partly sterile. It should be possible to develop cultivars of perennial upland rice but it will likely take 5 to 10 more years.

Inheritance of Increased Oleic Acid Concentration in Mustard

Several sources of zero-erucic acid Ethiopian mustard (Brassica carinata A. Braun) have been developed, but in all cases the seed oil was characterized by a high degree of polyunsaturation. This problem could be solved by transferring the increased oleic acid trait, currently available in mutants with high erucic acid content, to zero erucic acid backgrounds. In this research, Velasco et al. (p. 106–109) investigated the inheritance of increased oleic acid concentration in the high erucic acid Ethiopian mustard mutant N2-3591. Results revealed that increased oleic acid concentration in N2-3591 was the result of a mutation at a single locus. This simple, monogenic inheritance will facilitate the transference of the trait to zero-erucic acid Ethiopian mustard.

Assessment of Alfalfa during Fall Harvest

The underlying causes of the adverse effect of a fall harvest on alfalfa (Medicago sativa L.) persistence and yields are unclear. Dhont and coworkers (p. 181–194) assessed changes in root N reserves in response to the timing of the fall harvest. Fall accumulation (concentrations and amounts) of the specific amino acids proline, arginine, and histidine was depressed by harvesting early in the fall. The abundance of the major soluble protein of 32 kDa was also reduced by an early fall harvest. Results highlight the determinant contribution of specific N reserves to spring regrowth of alfalfa.

Carbon Isotope Discrimination and Yield in Durum Wheat

Measurement of carbon isotope discrimination (\( \Delta \)) in plant material is a promising method for improving transpiration efficiency and, consequently, crop yield in water-limited conditions. Durum wheat (Triticum turgidum L. var. durum) is mostly cultivated in Mediterranean conditions, where crop growth is most dependent on ground moisture stored during the crop season. Araus et al. (p. 170–180) studied the effect of environment on the relationship between grain \( \Delta \) and yield for durum wheat in the Mediterranean. Water input was responsible for the strong positive relationship observed between \( \Delta \) and yield across trials during grain filling. No correlation was found between \( \Delta \) and yield across genotypes for trials with a mean yield up to about 2000 kg ha\(^{-1}\), but for yields of 2500 kg ha\(^{-1}\) and above, the correlation was steady and positive, with an \( r \) value around 0.5. Breeding to raise durum yield in Mediterranean conditions could take advantage of selecting for higher \( \Delta \) only in relatively wet years, or under supplementary irrigation.

Condensed Tanin Concentration of Birdsfoot Trefoil

Condensed tannins are compounds that affect livestock performance. At moderate concentrations, tannins improve the ruminant animal’s absorption of soluble proteins. In this research, Wen et al. (p. 302–306) show that the new type of birdsfoot trefoil (containing rhizomes) contains at least twice the condensed tannins as the standard type of birdsfoot trefoil. Further, as birdsfoot trefoil is grown in a mixed pasture and then grazed, condensed tannin concentration is higher than in pure stands of ungrazed plants.

Development of Species-Specific SCAR Markers in Bentgrass

Bentgrass species (Agrostis spp) are cool season turfgrasses tolerant of close mowing heights and commonly used on golf courses and lawns. Some bentgrass species are difficult to distinguish because of similar morphological characteristics and genetic compatibility. Scheef and coworkers (p. 345–349) designed sequence characterized amplified region (SCAR) markers from RAPD bands to identify specifically creeping and colonial bentgrass species. These SCAR markers are useful for screening clones collected from naturalized populations and have potential for identifying progenies derived from artificial interspecific hybridizations among bentgrass species.

Bacterial Brown Spot Resistance in Common Bean

Bacterial brown spot (BBS), incited by Pseudomonas syringae pv. syringae (Pss), is an important bacterial disease