Evaluation of Flavor in Roasted Virginia- and Runner-type Peanut Breeding Lines


Flavor has long been identified by processors of Virginia- and runner-type peanuts (Arachis hypogaea L.) as the pre-eminent trait of importance in marketing finished product. As new peanut cultivars are developed, it is important that the flavor profiles of new releases meet or exceed those of the cultivars they are intended to replace.

The breeding program at N.C. State Univ. (NCSU) utilizes roasted peanut flavor as a criterion in breeding line selection. Trials are conducted within the state each year. Sensory analyses generally are conducted on relatively few lines (approximately 36 over the past ten years) each year, generally advanced lines already found to have acceptable yield, grade, and disease resistance. Sound mature kernels from grading samples of an entry in a trial at a location in a year are bulked across reps then divided into 16 subsamples. Eight subsamples are roasted as nearly possible to a common color (58.3 CIELAB \( L^* \) reading of cool paste), pooled, ground to paste and submitted to a trained descriptive sensory analysis panel in the Sensory Services Center in NCSU's Dept. of Food, Bioprocessing and Nutrition Sciences. Eight panelists evaluate the following attributes of each sample: roasted peanut, over-roast, under-roast, sweet, wood-hulls-skin, fruity, painty, stale/cardboard, moldy, petroleum/chemical, bitter, throat/tongue burn, astringent, nutty aftertaste and bitter aftertaste. Scores are averaged across panel sessions, trials and locations within years and the data are added to a database maintained since 1985. Multiple years, multiple-location analyses are performed, producing line means adjusted to a common environmental effect. Roast color and fruity attribute intensity are used as covariates where appropriate. From the 2012 crop year 23 NCSU breeding lines, 5 virginia-type cultivars, and 2 runner-type flavor standards (Florunner and Georgia Green) were evaluated. There was variation among lines (P<0.05) for nearly all traits. New high-oleic release Sullivan represented an improvement in roast peanut flavor over existing cultivars Bailey and Sugg. Among lines still under test, N09042olF, N11028ol, and N11051olJ had superior flavor profiles.

The Uniform Peanut Performance Test (UPPT) includes soon-to-be released breeding lines from public programs. All entries are grown at eight sites across all three U.S. Production regions. Pods are pooled across reps before being shelled and graded at the USDA-ARS Natl. Peanut Res. Lab. in Dawson, GA. Medium runner, jumbo runner, or Virginia extra-large kernels are evaluated for quality
characteristics as appropriate for the test entry. Flavor is assessed by the USDA-ARS Market Quality and Handling Res. Unit in Raleigh, NC. A database of sensory and composition data from the UPPT is maintained and summarized annually to determine if new releases have flavor profiles as good as or superior to existing cultivars. For the Virginia- Carolina (VC) area where virginia-type cultivars predominate, Sullivan and Wynne had better flavor profiles than the widely grown cultivars Bailey and Sugg. In the VC area, runner-type lines TUFRunner™ 756 and Georgia-12Y were superior runner-type releases with respect to flavor. In the Southeastern reps of the UPPT, TUFRunner™ 756 and Georgia-12Y were markedly superior in flavor to the very commonly grown cultivar Georgia-06G. In the Southwest, Georgia-09B represented a substantial improvement over common cultivars Flavor Runner 458 and TAMrun OL07. It is evident that there is improvement that can be made in the flavor of the U.S. peanut crop in any of the three major production regions simply by choice of which to use out of existing cultivars. It is further evident that there is progress to be made in flavor through breeding new cultivars if flavor is monitored.