



For many corn growers, the return from a bushel of corn demands more than just dollars per bushel. Livestock producers, ethanol processors, and other corn grain end-users require a corn crop to consistently deliver the quality characteristics required by their operations. Syngenta Agronomy Research conducts multi-year and multi-location testing to characterize corn hybrids for critical grain and feed attributes and increased ethanol yield. This testing approach allows Syngenta to identify hybrids that consistently provide high levels of a desired grain characteristic. Syngenta agronomists collect grain samples at harvest and use near infrared analysis and proprietary calibrations developed by Syngenta to analyze for feed components (oil, protein, and starch content) and ethanol yield.

Critical Grain Feed Characteristics

Protein

- Essential source of nitrogen and amino acids needed for growth and maintenance of the animal's body.

Oil and Starch

- Oil and starch supply elements necessary to meet energy, fat deposition, and heat production needs of the animal.
- Starch is the largest single component in corn grain and the primary source of energy.
- Oil is more energy dense than starch, thus a unit change in oil content affects the energy supplied by the feed more than a similar unit change in starch.

Ethanol Yield Factors

- Ethanol yield is influenced by much more than just starch content.
- Syngenta has developed a proprietary method of estimating ethanol yield in a dry grind process.
- Depending on local ethanol processor grain preferences, a high yielding hybrid with average ethanol output could be just as profitable as a lower yielding hybrid with high ethanol output.



Factors Influencing Grain End-Use Characteristic Content

Genetics

- Some hybrids consistently produce higher levels of specific end-use characteristics.
- Hybrids with high expression of a specific characteristic (starch, oil, ethanol) generally produce more of that component than other hybrids, regardless of growing conditions.

Environmental Conditions and Geographic Growing Area

- Factors affecting overall yield potential such as temperature, rainfall and/or irrigation timing, soil characteristics and field management have considerable influence on the expression of end-use characteristics.
- Corn grown in more northern environments tends to be higher in protein than corn grown further south, while corn grown in central and southern environments tends to produce higher starch content.
- Select hybrids based on adaptability to local growing environment needs and then consider differences in grain end use characteristics.

Cultural Practices

- Planting date, population, fertility and other management affects hybrid end-use characteristics. For example, inadequate nitrogen fertility correlates to decreased grain protein levels.
- Follow locally adapted practices in your area to maximize grain yield.



Garst® Brand Corn Hybrid End Use Guide

Hybrid Series	RM	Starch	Protein	Oil	Ethanol	Hybrid Series	RM	Starch	Protein	Oil	Ethanol
89N10	77	✘	★	★	✘	86G35	105	★	▼	▼	●
89R58	80	●	★	★	▼	85V24	106	▼	●	●	▼
89V30	83	★	●	★	▼	85K93	106	★	✘	★	●
89S28	83	★	▼	●	●	85F03	106	●	●	▼	●
89S01	85	●	●	★	▼	85V88	107	★	▼	★	●
89A33	85	●	▼	●	▼	85R08	108	●	▼	★	●
89J14	86	★	●	●	✘	85E98	109	★	●	▼	●
89K65	88	●	▼	▼	✘	84S08	109	▼	▼	★	▼
89G13	90	●	▼	●	▼	85Z64	110	▼	▼	●	●
89X34	91	●	▼	●	▼	85K17	110	●	▼	●	●
89T43	92	●	●	▼	●	84Y14	111	●	▼	★	▼
88L03	93	✘	★	●	●	84U58	111	▼	●	★	●
88R16	94	★	▼	✘	★	84T28	111	●	●	▼	●
88Q29	96	●	★	✘	●	84A40	111	●	▼	●	●
88K05	96	●	▼	●	▼	84Z02	112	●	▼	✘	★
88E24	96	✘	●	●	▼	84Q55	112	●	▼	▼	●
88W22	97	▼	★	★	▼	84J30	112	●	●	●	★
88U62	97	●	▼	●	●	84H71	112	●	▼	●	●
88R89	97	▼	●	▼	●	84G70	112	▼	▼	★	▼
88F75	97	▼	★	★	✘	83T94	112	●	●	✘	●
88A27	97	▼	★	▼	●	84U96	113	★	▼	★	●
88M51	98	★	●	▼	●	84N18	113	✘	●	▼	●
88B37	99	★	▼	✘	★	83S06	113	▼	▼	●	▼
87G94	100	★	●	✘	★	83L67	113	▼	●	●	▼
87V47	101	●	▼	✘	★	83F08	113	▼	●	●	▼
87U28	101	●	✘	★	●	83E90	113	●	✘	✘	●
87Q79	101	●	▼	★	●	83B40	113	●	●	▼	●
87P52	101	●	●	▼	●	83X61	114	●	▼	▼	●
87F33	101	✘	●	●	▼	83R38	114	●	▼	●	●
87Y27	102	▼	●	●	▼	83D19	114	▼	●	★	▼
87W74	102	★	●	✘	★	83C55	114	●	▼	●	●
87T18	102	★	▼	✘	●	83A24	114	●	●	●	●
87W95	103	●	▼	★	●	83P07	115	✘	★	✘	●
87D54	103	▼	▼	★	●	83M47	115	▼	●	▼	●
86J49	103	★	✘	✘	★	82R05	115	▼	●	✘	●
86X11	104	●	▼	●	●	82K01	116	●	▼	●	●
86T82	105	★	▼	▼	●	82R44	117	●	★	▼	●
86M39	105	●	▼	●	●	82H82	118	★	●	▼	●
86H30	105	★	▼	✘	★						

Hybrids in this chart were tested in multiple environments. Ratings are determined using hybrid end-use characteristic values relative to other hybrids. When selecting a hybrid, keep in mind that a high yielding, locally adapted hybrid with a “●” rating can return more than a hybrid that is not locally adapted with a “★” rating.

Hybrid End Use Categories

- ★ Highest end-use characteristic content over years and growing environments for which the hybrid is adapted.
- Very good end-use characteristic levels.
- ▼ End-use characteristic levels are rarely maximized and usually result in average to below average characteristic content.
- ✘ Low levels of end-use characteristics.

Ratings are not absolute and are based on interpretation of statistically analyzed results of studies conducted by Syngenta Agronomy Research.

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This bulletin was developed by Syngenta Agronomy Research. Syngenta Agronomy Research studies and evaluates environmental and cultural practices that impact yield in both corn and soybean production to provide answers to the critical issues facing growers. In 2010, 27 research trials were conducted at 10 Syngenta Agronomy Research locations.