Hybrid vigor is an excess in vigor of a hybrid over the midpoint between its parents. The percent hybrid vigor is calculated as follows:

\[
\text{Percent hybrid vigor} = \left[ \frac{F_1 - (P_1 + P_2)/2}{(P_1 + P_2)/2} \right] \times 100
\]

Only when the offspring \(F_1\) exceeds the better parent is hybrid vigor of practical significance.

As early as 1716, Cotton Mather recorded the effects of cross-fertilization in plants, ascribing the different-colored grains on an ear of maize to a wind-borne intermixture of cultivars. During the next half century, others made and described hybrids in plants, usually maize. From 1761 to 1766, the German botanist Koelreuter carried out the first systematic studies on plant hybridization (Koelreuter, 1766). He noted that interspecific hybrids were difficult to make and often were sterile. A description of the increased vigor in some of his hybrids is the first published record of hybrid vigor.

During the next century, plant hybridization was routinely practiced by many biologists and farmers. In his classical paper, “Versuche uber Pflanzen—Hybriden,” Mendel (1865) wrote, “In repeated experiments, stems of 1 foot and 6 feet in length yielded, without exception, hybrids which varied in length between 6 and 7½ feet.” Darwin (1877) carefully measured the amount of hybrid vigor in many hybrids and published his data in *The Effects of Cross and Self Fertilization in the Vegetable Kingdom*. In the first sentence of his last chapter, Darwin wrote, “The first and most important conclusion which may be drawn from the observations in this volume is that cross-fertilization is generally beneficial and self-fertilization injurious.”

Although many scientists had studied and reported on hybridization, inbreeding depression, and hybrid vigor, Shull (1908) deserves credit for the modern concept of hybrid vigor. In his publication, *The Composition of a Field of Maize*, Shull (1908) suggested that the increased vigor in hybrids...