SIRE INDEX

Sire index is the estimate of the hereditary potentialities of a bull for milk production or any other trait. The sire's transmitting ability for production is estimated by mathematical means and expressed as sire index or bull index. In other words, breeding values of the bulls are expressed by sire indices. Several indices for assessing the breeding worth of sires have been developed. They are as follows:

- **Simple daughter average index** (Edward, 1932)

  $S_I = D_i = [1 / m_i] \Sigma D_{ij}$

  where, D_{ij} = yield of jth daughter of the ith sire

  m_i = number of dams mated to i_{th} sire

- **Yapp's index or Equiparent index** (Yapp, 1925)

  $P = S + D / 2$

  $S + D = 2P$

  $S_I = 2P - D$

  where, P = average of the progeny

  D = average of the dams

- **Mount hope index** (Goodale, 1927)

  SI = D + 3/7 (D − M) when daughter's average exceeds dam's average

  = D − 7/3 (M − D) when daughter's average is less than dam's average

  where, D = average of the daughters

  M = average of the dams

- **Gifford's index** (Gifford, 1930)

  $S_I = 2P - H$

  where, H = herd average

  - **Wright's index** (Wright, 1931)

  SI = [2 / n+2] + [H / n+2] X (2P − D)

  where, n = number of dam-daughter comparisons

  H = herd average

  P = daughters average

  D = dams average

- **Corrected daughter average index or Krishnan's index** (Krishnan, 1956)

  $S_I = D − b_{DM} (M − H)$

  where, D = daughters average

b_{DM} = intrasire regression of daughter on dam

M = dams average

H = herd average

- **Dairy search index** (Sundaresan, 1965)
  $S_I = A + [n / n+12] [(D − C_D) − b(M − C_M)]$

  where, A = herd average

  n = number of daughters

  D = daughters average

  M = dams average

  C_D = weighted average of contemporary daughters

  C_M = weighted average of contemporary dams

  b = regression coefficient

- **Herdmate comparison** (Henderson and Carter, 1957)
  $PD = [(n_i / (n_i + 20)] \{D_i - 0.9 (HM_i − A) − A\}$

  where, PD = predicted difference

  D_i = average of the daughters at the ith herdmate level

  HM_i = average of the herdmates at i^{th} herdmate level

  n_i = number of daughters at the ith herdmate level

- **Contemporary comparison**
  $I = \mu + \{n / n + k\} (D - C)$

  where, n = number of daughters

  C = average of daughters' contemporaries

  k = ratio of error variance to sire variance

- **Best linear unbiased prediction (BLUP)** (Henderson, 1975)
  $Y_{ijk} = \mu + F_i + S_j + E_{ijk}$

  where, Y_{ijk} = measurement on the kth progeny of the jth sire born in the ith herd- year- season

  μ = overall mean

  F_i = effect of the ith herd- year- season

  S_j = effect of the jth sire born

  E_{ijk} = residual error