

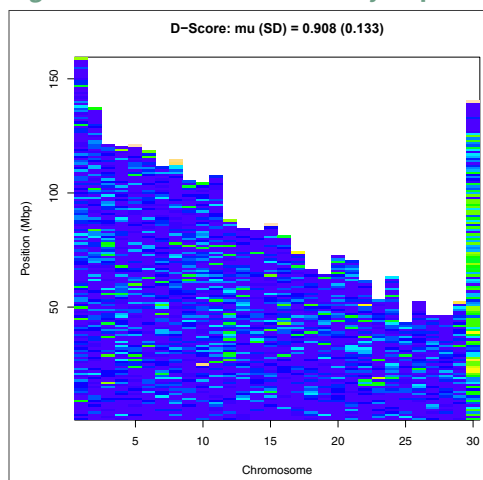


## GeneSeek® Genomic Profiler™ *indicus*

Utilise the power of the next generation of bovine genotyping technologies. The updated GGP *indicus* leverages NEOGEN®'s leading SNP selection process to precisely choose the most informative SNPs for your genomic selection or research goals. These advantages plus a host of causative mutations, make the GGP *indicus* an instant leader in its class.

- The GGP *indicus* chip consists of 54,791 SNPs that are optimally selected using the Select SNP software package that features MOLO optimization (Wu et al., 2016). The chip also includes *Bos indicus* specific SNPs for parentage testing, and causative assays for genetic diseases.
- The highly optimised 50K SNP panel features:
  - Better coverage — Average SNP spacing of 48.9 kb across all autosomal chromosomes
  - Even distribution — Average D score of 0.91 and U score of 0.72
  - Appropriate overlap with multiple SNP panels to allow for accurate imputation
    - Also includes novel SNP content more pertinent to *Bos indicus* influenced breeds
  - Astounding MAF — Average minor allele frequency (MAF) across eight breeds of 0.30
  - Imputation accuracy (to the Illumina BovineHD) averages greater than 98% for all evaluated breeds

Figure 1. GGP *indicus* SNP Density Map





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**Table 1. Distribution of minor allele frequencies (MAF) by breed**

It is inherent that as the number of markers in a panel increases, there are less SNP available with high MAF in a breed. Therefore, the average MAF will decrease when compared to its predecessor, GGP *indicus* 35K, but rest assured the best SNP content was selected for addition to NEOGEN's SNP panel. This is illustrated in Table 1, which shows that the highest proportion of markers still have MAF between 0.30–0.50.

Breed	Proportion of SNPs by MAF Group				Average MAF by Breed
	0.00–0.04	0.05–0.19	0.20–0.29	0.30–0.50	
Brahman	0.11	0.17	0.12	0.61	0.31
Guzera	0.17	0.16	0.14	0.53	0.27
Gyr	0.17	0.16	0.13	0.53	0.28
Nelore	0.16	0.16	0.12	0.57	0.29
Droughtmaster	0.05	0.13	0.18	0.64	0.33
Santa Gertrudis	0.08	0.22	0.19	0.52	0.29
Tropical Composite	0.05	0.21	0.18	0.56	0.31
Other <i>indicus</i>	0.10	0.15	0.15	0.59	0.30

**Table 2. The number of common SNPs between GGP *indicus* and several commonly utilized commercial SNP panels**

Product	Number of Common SNPs
GGP Bovine 100K	18,817
Illumina Bovine SNP50 v3	10,952
GGP HDi	20,328
Illumina BovineHD	54,131

**Figure 2. Imputation accuracies, by chromosome, from GGP *indicus* to the Illumina BovineHD in Nelore cattle**

