

Bos taurus Genome Array-Ready Oligo Set™ (Version 1.1)

The Operon *Bos taurus* AROS Version 1.1 contains 8329 70-mer oligonucleotide probes representing 8329 genes from *B. taurus* genome. Each probe contains an amino linker at its 5' end.

Sequence source and gene selection

Gene sequences used for probe design are obtained from TIGR Cattle Gene Index Release 11 (http://www.tigr.org/tigr-scripts/tgi/T_index.cgi?species=cattle) and GenBank.

Probe design and selection rules

1. The 70-mer probes are selected with an optimal set of parameters as described below.
2. The melting temperatures (T_m) of the probes are restricted within the range of 78 ± 5 °C. T_m is calculated using the following formula:
$$T_m = 81.5 + 16.6 \times \log[\text{Na}^+] + 41 \times (\#G + \#C) / \text{length} - 500 / \text{length}$$
 where $[\text{Na}^+] = 0.1$ M and $\text{length} = \#A + \#C + \#G + \#T$
3. The contiguous single nucleotide repeat or poly (N) tract within a probe is limited to 7 bases or shorter.
4. The hairpin stem length of a probe is controlled at 8 bases or shorter.
5. The cross hybridization score for the probe against other non-representing (non-self) genes in the genome is set 70% or less of BLAST percent identity score.
6. The contiguous base match to other non-self genes is constrained at 20 bases or less.
7. The selection distances of the oligos are within 1,000 bases from the 3' end of the gene sequences.

The probes with the highest specificity (or the least cross-hybridization scores) are selected from a pool of candidates satisfying all the rules as described above.

The exceptions (relaxation of one or more selection rules) are made for the probe candidates of 1228 genes (14.7%), which don't meet the rules as mentioned above.

SUMMARY

Selection rules	Threshold	Probe Number
Probe length (bases)	70	7101
Melting temperature (°C)	78 ± 5	
Poly (N) tract length (bases)	< 8	
Hairpin stem length (bases)	< 9	
Distal distance from 3' end	< 1000	
Cross-hybridization score (identity %)	≤ 70	
Contiguous base match to non-self ORFs (bases)	≤ 20	
Exceptions		1228
Total		8329

The following illustrations show the distribution of all 3582 probes for melting temperature, GC content, distance from 3' end, hairpin stem length, and cross-hybridization identity.

Figure 1. Melting Temperature

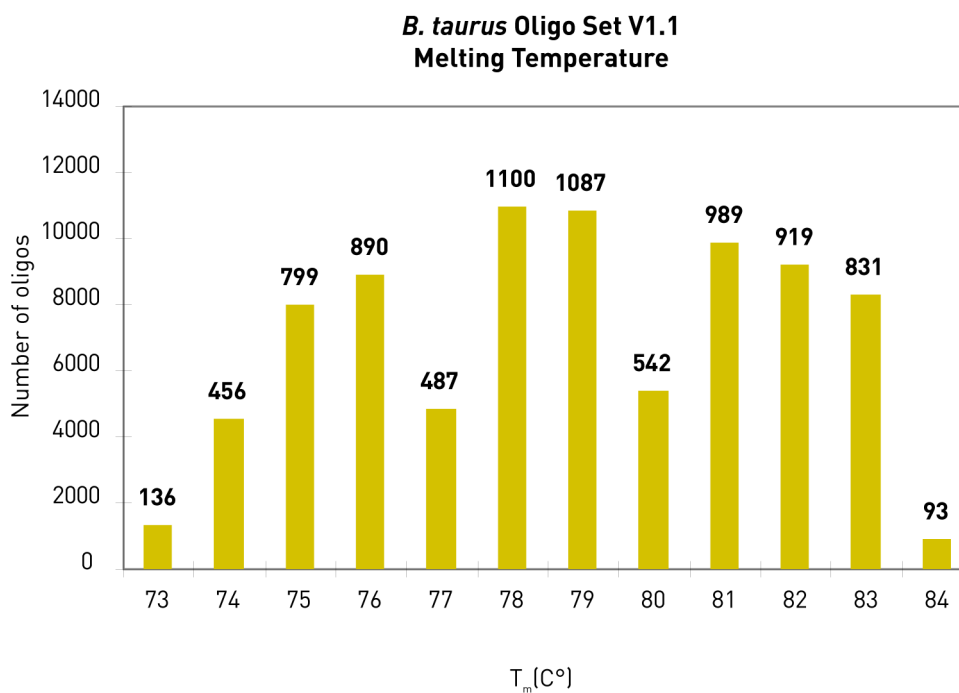


Figure 2. GC Content

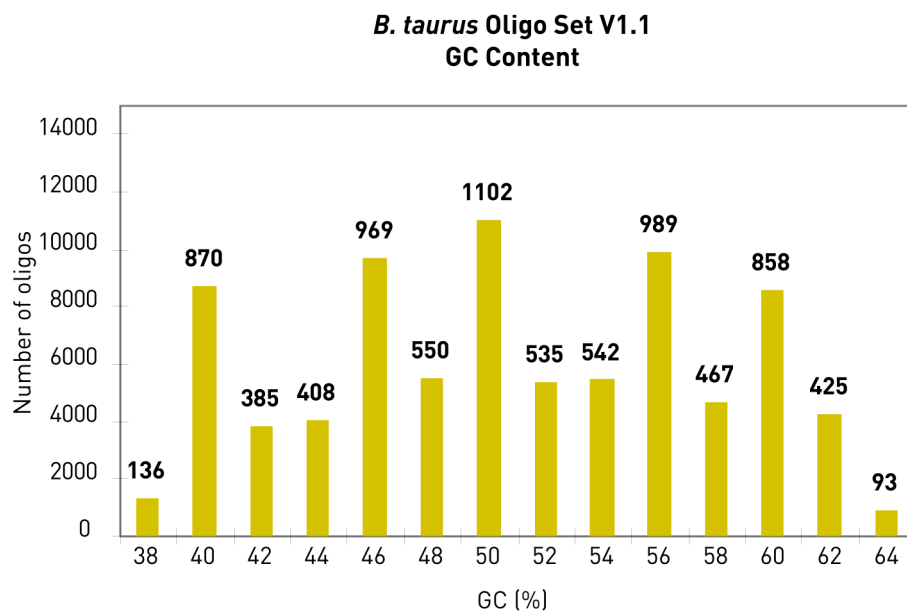


Figure 3. Distance from 3' End

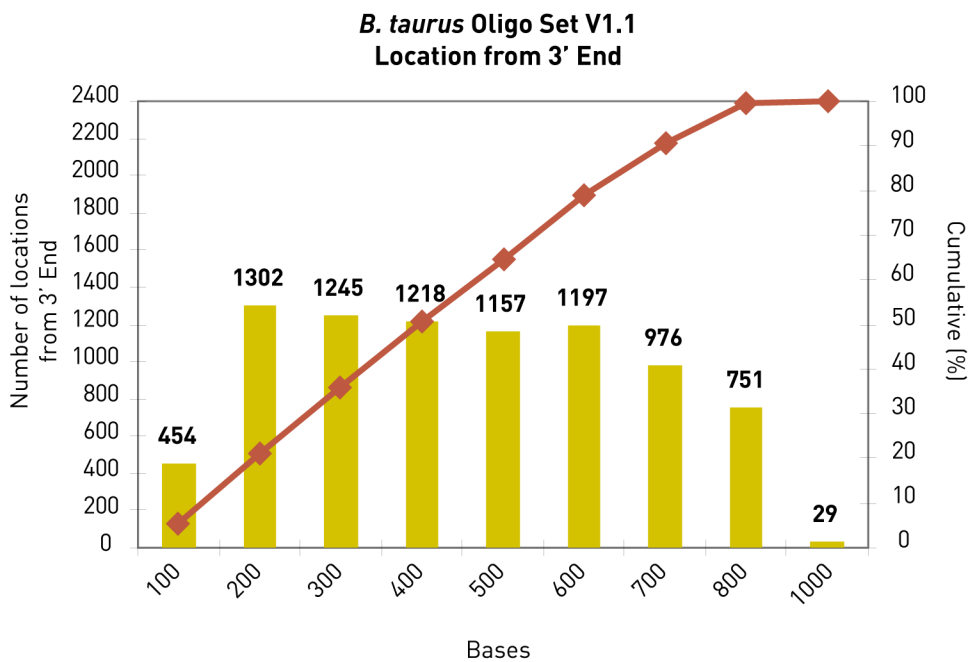


Figure 4. Hairpin Stem Length

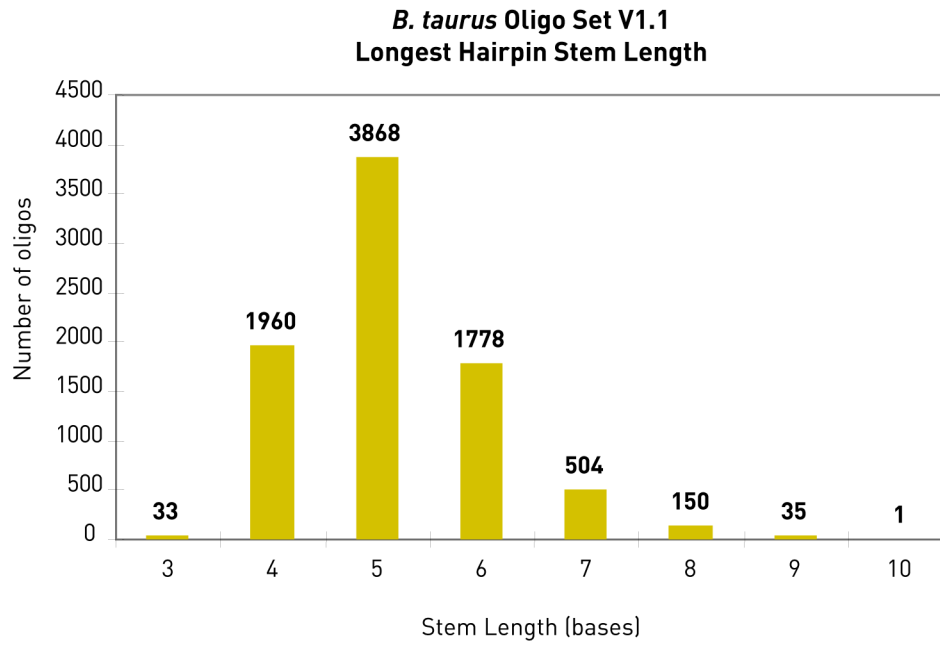


Figure 5. Cross-Hybridization Score

