**Table 1S** Reliability for bulls (n = 736) for the N intake in primiparous (NINT1), milk true protein N in primiparous (MTPN1), milk urea nitrogen yield in primiparous (MUNY1), N intake in multiparous (NINT2+), milk true protein N in multiparous (MTPN2+), and milk urea nitrogen yield in multiparous (MUNY2+)

| Reliability | NINT1 | MTPN1 | MUNY1 | NINT2+ | MTPN2+ | MUNY2+ |
|---|---|---|---|---|---|---|
| Minimum | 0.38 | 0.57 | 0.60 | 0.37 | 0.49 | 0.54 |
| Maximum | 0.94 | 0.98 | 0.99 | 0.96 | 0.99 | 0.99 |
| Mean | 0.63 | 0.82 | 0.85 | 0.67 | 0.84 | 0.84 |
| Standard deviation | 0.14 | 0.10 | 0.09 | 0.14 | 0.11 | 0.10 |

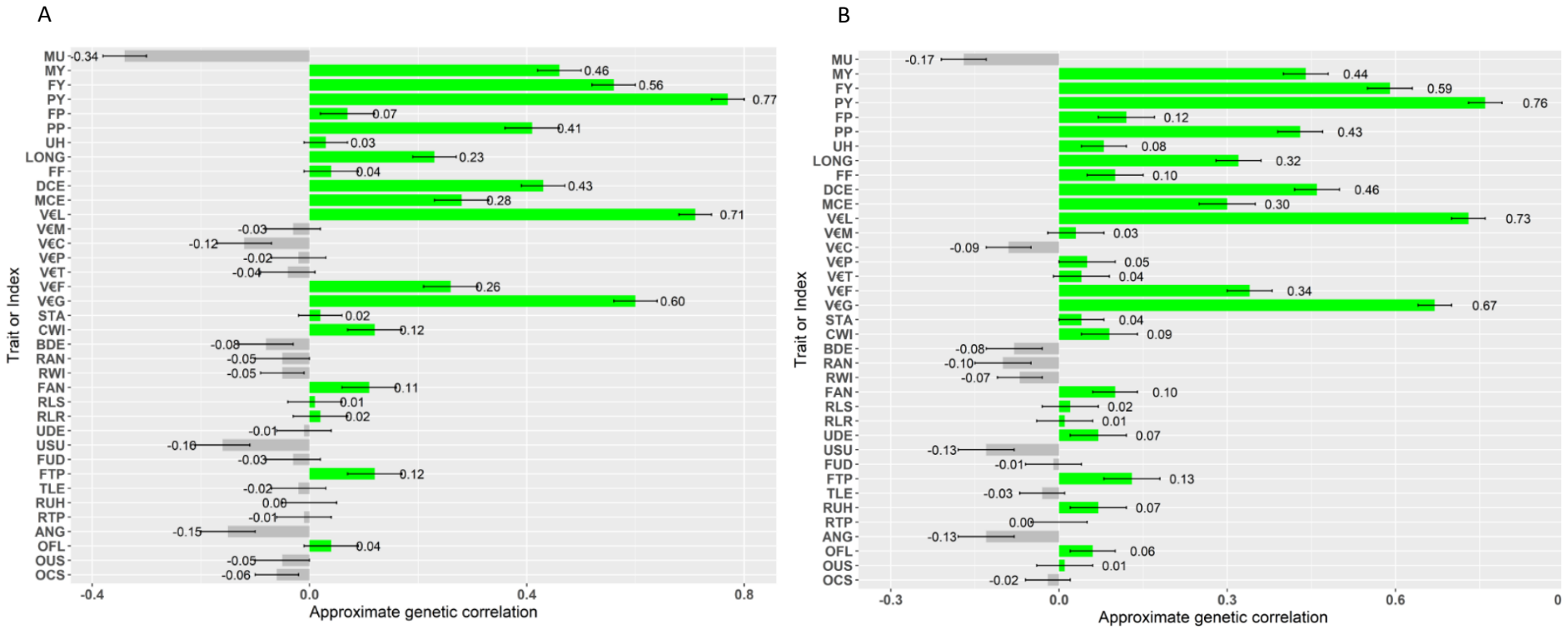


**Figure 1S** Approximate genetic correlation between nitrogen intake (NINT) and other traits based on the EBV of selected bulls (n = 736) in primiparous (A, NINT1) and multiparous (B, NINT2+). Other traits included were milk urea concentration (MU), milk yield (MY), fat yield (FY), protein yield (PY), fat percentage (FP), protein percentage (PP), udder health (UH), longevity (LONG), female fertility (FF), direct calving ease (DCE), maternal calving ease (MCE), production economic index (V€L), member economic index(V€M), capacity economic index (V€C), udder economic index (V€P), functional type economic index(V€T), functional economic index (V€F), global economic index (V€G), Stature (STA), chest width (CWI), body depth (BDE), rump angle (RAN), rump width (RWI), foot angle (FAN), rear leg set (RLS), rear leg rear view (RLR), udder depth (UDE), udder support (USU), fore udder (FUD), front teat placement (FTP), teat length (TLE), rear udder height (RUH), rear teat placement (RTP), angularity (ANG), overall feet and leg score (OFL), overall udder score (OUS), and overall conformation score (OCS). (Note: all standard errors of the approximate genetic correlations were < 0.05)

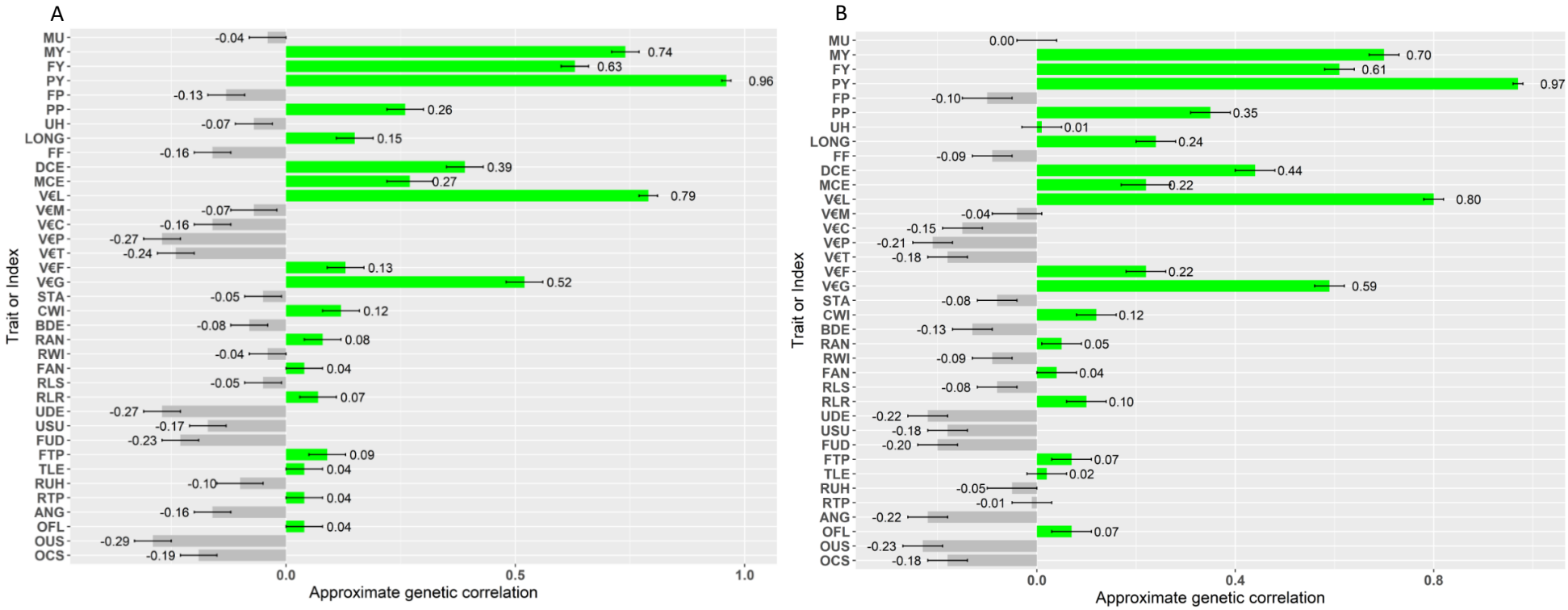


**Figure 2S** Approximate genetic correlation between milk true protein nitrogen (MTPN) and other traits based on the EBV of selected bulls (n = 736) in primiparous (A, MTPN1) and multiparous (B, MTPN2+). Other traits included were milk urea concentration (MU), milk yield (MY), fat yield (FY), protein yield (PY), fat percentage (FP), protein percentage (PP), udder health (UH), longevity (LONG), female fertility (FF), direct calving ease (DCE), maternal calving ease (MCE), production economic index (V€L), member economic index(V€M), capacity economic index (V€C), udder economic index (V€P), functional type economic index(V€T), functional economic index (V€F), global economic index (V€G), Stature (STA), chest width (CWI), body depth (BDE), rump angle (RAN), rump width (RWI), foot angle (FAN), rear leg set (RLS), rear leg rear view (RLR), udder depth (UDE), udder support (USU), fore udder (FUD), front teat placement (FTP), teat length (TLE), rear udder height (RUH), rear teat placement (RTP), angularity (ANG), overall feet and leg score (OFL), overall udder score (OUS), and overall conformation score (OCS). (Note: all standard errors of approximate genetic correlation < 0.05)

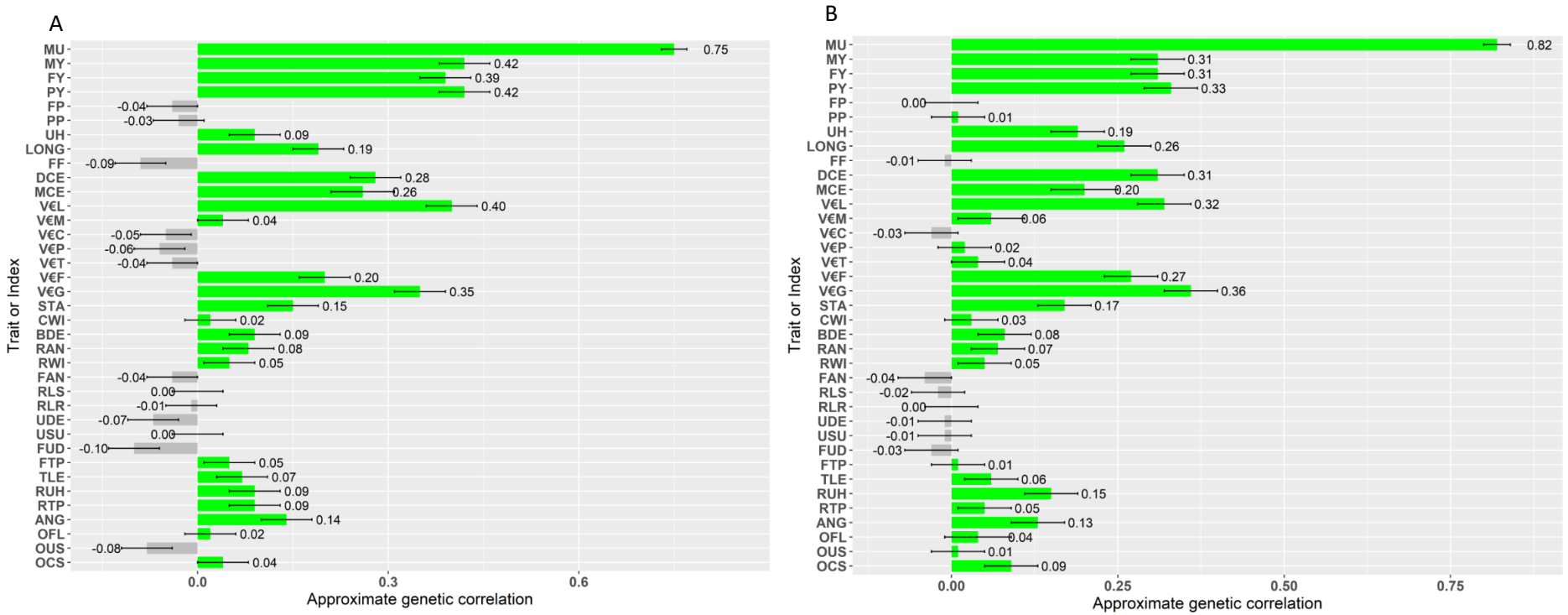


**Figure 3S** Approximate genetic correlation between milk urea nitrogen yield (MUNY) and other traits based on the EBV of selected bulls (n = 736) in primiparous (A, MUNY1) and multiparous (B, MUNY2+). Other traits included were milk urea concentration (MU), milk yield (MY), fat yield (FY), protein yield (PY), fat percentage (FP), protein percentage (PP), udder health (UH), longevity (LONG), female fertility (FF), direct calving ease (DCE), maternal calving ease (MCE), production economic index (V€L), member economic index(V€M), capacity economic index (V€C), udder economic index (V€P), functional type economic index(V€T), functional economic index (V€F), global economic index (V€G), Stature (STA), chest width (CWI), body depth (BDE), rump angle (RAN), rump width (RWI), foot angle (FAN), rear leg set (RLS), rear leg rear view (RLR), udder depth (UDE), udder support (USU), fore udder (FUD), front teat placement (FTP), teat length (TLE), rear udder height (RUH), rear teat placement (RTP), angularity (ANG), overall feet and leg score (OFL), overall udder score (OUS), and overall conformation score (OCS). (Note: all standard errors of approximate genetic correlation < 0.05)