**File S8. The performances of six expression profile-based GO prediction methods for each individual species on CAFA3 test dataset**

We further benchmarked the performances of six expression profile-based GO prediction methods for each of 7 species on CAFA3 test dataset. Figure S13 shows the values of Fmax and AUPR for 7 species via six expression profile-based methods. Table S12 summarizes the *P* values of Fmax and AUPR values between TNP and other five methods in student’s t-test [1] for 7 species. We can observe that TNP achieves the highest values of Fmax and AUPR among six methods for each GO aspect in most of 7 species. Taking human species as an example, TNP achieves 11.9% and 7.8% average increases on three GO aspects for Fmax and AUPR, respectively, in comparison with the second-best performer, *i.e.,* MR.

[1] Ruxton GD. The unequal variance t-test is an underused alternative to Student's t-test and the Mann–Whitney U test. Behav Ecol 2006;17:688–90.