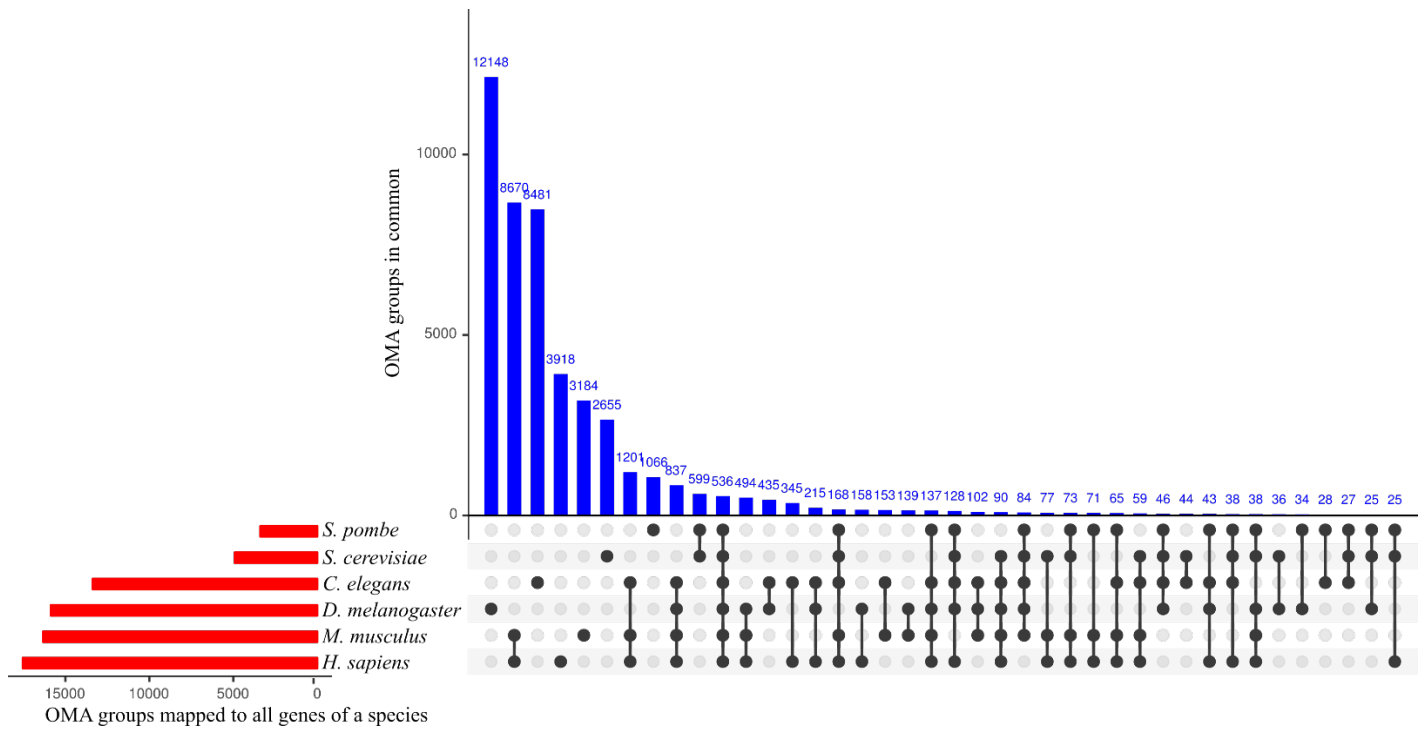
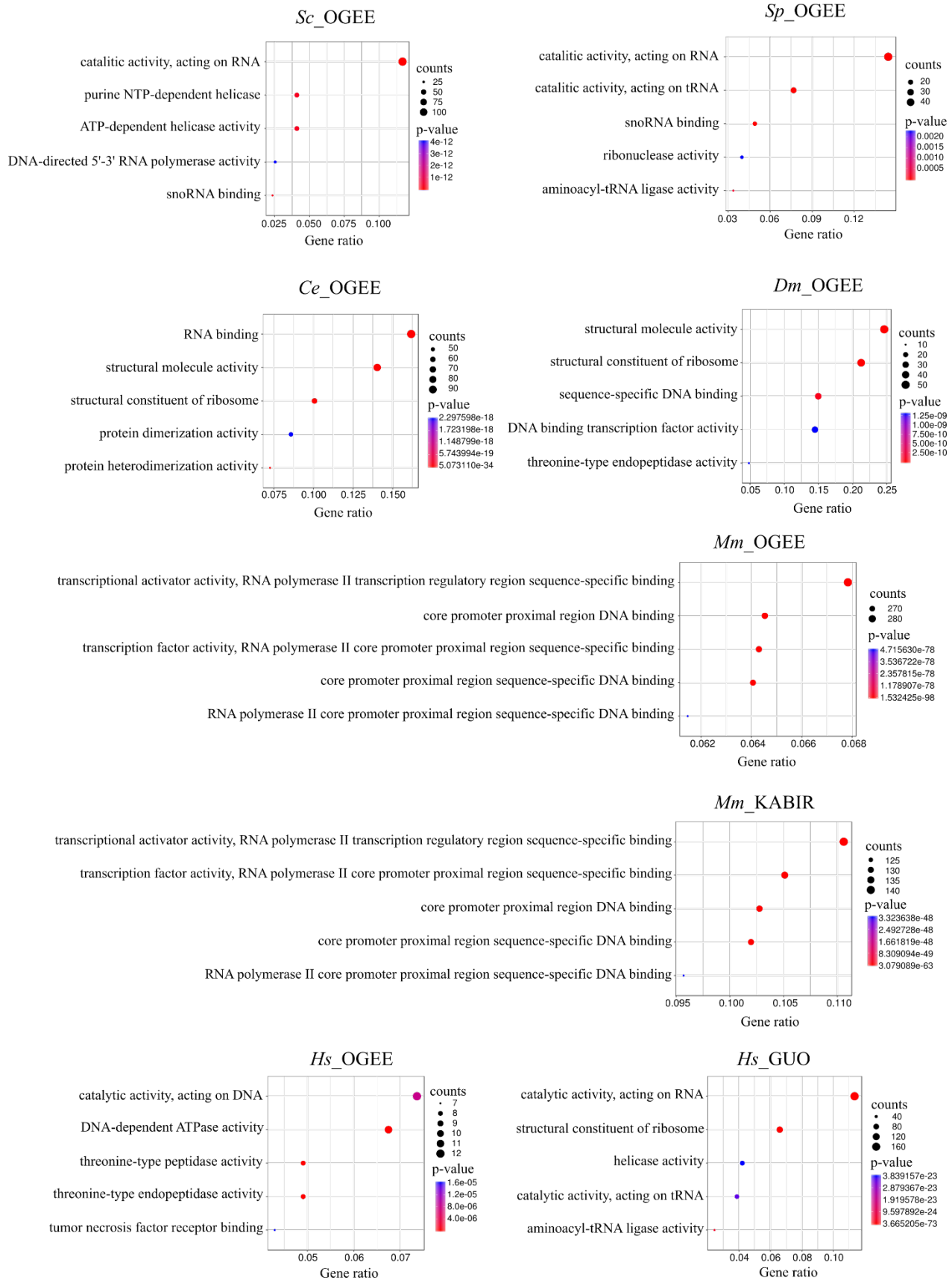


**SUPPLEMENTARY FIGURES:**



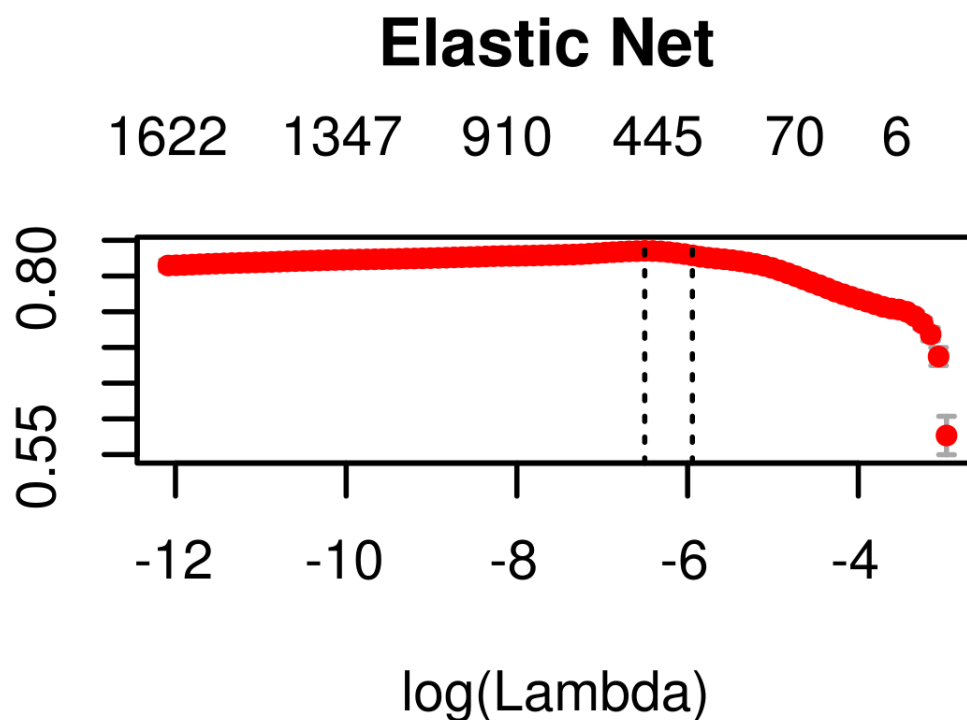
**Fig. S1.** Diagram exhibiting the total (red) and shared (blue) ortholog identifiers (complete predicted proteomes) for the species used in the present study, obtained from the OMA database.



**Fig. S2.** Molecular function enrichment analysis (“enrichGO” function, “clusterProfiler” package in R) of gene ontology terms of essential genes per data set.

Shared features \ Dataset (#selected features)	Sc_OGEE (118)	Sp_OGEE (156)	Ce_OGEE (215)	Dm_OGEE (123)	Mm_OGEE (260)	Mm_KABIR (44)	Hs_OGEE (129)	Hs_GUO (251)
CTriad_VS666	Green	Green	Red	Red	Green	Green	Green	Green
CTDD_prop1.G2.residue0	Red	Red	Green	Red	Red	Green	Red	Green
QSO_Schneider.Xr.W	Red	Red	Red	Red	Green	Green	Green	Green
PAAC_Xc1.M	Red	Red	Green	Red	Green	Green	Red	Green
DC_QI	Green	Green	Green	Red	Green	Green	Red	Red
DC_PM	Red	Red	Green	Green	Green	Green	Red	Green
DC_PH	Red	Green	Green	Red	Green	Green	Red	Green
CTriad_VS636	Green	Green	Red	Red	Red	Red	Red	Green
CTriad_VS555	Red	Red	Red	Red	Green	Green	Red	Green
CTriad_VS536	Red	Green	Green	Red	Red	Red	Red	Green
CTriad_VS521	Red	Green	Red	Red	Green	Green	Red	Green
CTDD_prop1.G3.residue25	Green	Red	Green	Red	Red	Red	Red	Red
APAAC_Pc1.Q	Green	Green	Red	Green	Red	Red	Red	Green

**Fig. S3.** List of shared features selected by both ElasticNet and Ensemble SPLS methods among at least 4 data sets. The total number of features selected for each species/data set is reported.



**Fig. S4.** An example of the application of ElasticNet as a feature-selection procedure using *C. elegans* data. The x-axis represents the lambda parameter tested (bottom) and the corresponding retained features (top). The y-axis represents the ROC-AUC using 10-fold cross-validation. The final set of selected features maximises this metric.

## **OTHER SUPPLEMENTARY FILES:**

- Table S1. Selected features of each data set and importance of feature
- R “*Sessioninfo*” file
- Fasta files (data sets) and R scripts (online - <https://bitbucket.org/tuliocampos/essential> and a static version referring to this publication - <http://doi.org/10.6084/m9.figshare.8063069>)