Supplemental Materials: Total computational tables in the regression and artificial neural network

Table S1. The results of the MLP model for the training step

Network	Algorithm	Error Function	Hidden activation	R²	RMSE	% RMSE	BIAS	% BIAS
MLP 10-9-1	**BFGS 106**	**SOS**	**Tanh**	**0.48**	**0.52**	**21.84**	**0.0008**	**0.0336**
MLP 10-6-1	BFGS 54	SOS	Exponential	0.43	0.59	24.78	0.0015	0.0630
MLP 10-4-1	BFGS 55	SOS	Exponential	0.42	0.63	26.47	0.0017	0.0714
MLP 10-7-1	BFGS 128	SOS	Tanh	0.46	0.58	24.36	0.0011	0.0462
MLP 10-6-1	BFGS 177	SOS	Logistic	0.44	0.57	23.94	0.0010	0.0420
RBF 10-28-1	RBFT	SOS	Gaussian	0.21	0.83	34.87	0.0132	0.5546
RBF 10-21-1	RBFT	SOS	Gaussian	0.08	1.31	55.04	0.244	10.252
RBF 10-19-1	RBFT	SOS	Gaussian	0.11	0.91	38.23	0.053	2.2268
RBF 10-22-1	RBFT	SOS	Gaussian	0.10	1.10	46.21	0.054	2.2689
RBF 10-20-1	RBFT	SOS	Gaussian	0.09	1.23	51.68	0.243	10.210

MLP = multilayer perceptron (10-7-1 implies 10 = number of input layers; 7 = number of hidden layers; and 1 = number of output layer)
BFGS = Broyden-Fletcher-Goldfarb-Shanno
RBFT = Radial Basis Function Training
SOS = Symbiotic Organisms search

Table S2. The results of the MLP model for the validation step

Network Name	Algorithm	Error Function	Hidden activation	R²	RMSE	% RMSE	BIAS	% BIAS
MLP 10-9-1	**BFGS 106**	**SOS**	**Tanh**	**0.44**	**0.63**	**26.47**	**0.0010**	**0.04201**
MLP 10-6-1	BFGS 54	SOS	Exponential	0.41	0.74	31.09	0.0018	0.07563
MLP 10-4-1	BFGS 55	SOS	Exponential	0.40	0.78	32.77	0.0021	0.08823
MLP 10-7-1	BFGS 128	SOS	Tanh	0.40	0.76	31.93	0.0022	0.09243
MLP 10-6-1	BFGS 177	SOS	Logistic	0.42	0.71	29.83	0.0016	0.06722
RBF 10-28-1	RBFT	SOS	Gaussian	0.11	1.41	59.24	0.218	9.15966
RBF 10-21-1	RBFT	SOS	Gaussian	0.05	1.65	69.32	0.283	11.8907
RBF 10-19-1	RBFT	SOS	Gaussian	0.07	1.59	66.80	0.261	10.9663
RBF 10-22-1	RBFT	SOS	Gaussian	0.10	1.43	60.08	0.224	9.41176
RBF 10-20-1	RBFT	SOS	Gaussian	0.05	1.66	69.74	0.281	11.8067

Table S3. Characteristics of RBF and MLP-based ANNs and associated metrics for diameter model training

Network Name	Algorithm	Error Function	Hidden activation	R²	RMSE	% RMSE	BIAS	% BIAS
MLP 10-11-1	**BFGS 196**	**SOS**	**Exponential**	**0.49**	**0.50**	**20.92**	**0.0005**	**0.020**
MLP 10-7-1	BFGS 80	SOS	Tanh	0.44	0.61	25.52	0.0019	0.079
MLP 10-5-1	BFGS 235	SOS	Logistic	0.42	0.68	28.45	0.0022	0.092
MLP 10-5-1	BFGS 66	SOS	Exponential	0.43	0.65	27.19	0.0023	0.096
MLP 10-6-1	BFGS 65	SOS	Logistic	0.42	0.69	28.87	0.0026	0.108
RBF 10-28-1	RBFT	SOS	Gaussian	0.17	0.9	37.69	0.183	7.656
RBF 10-27-1	RBFT	SOS	Gaussian	0.11	1.43	59.83	0.251	10.502
RBF 10-24-1	RBFT	SOS	Gaussian	0.09	1.89	79.07	0.198	8.284
RBF 10-18-1	RBFT	SOS	Gaussian	0.04	1.99	83.26	0.283	11.841
RBF 10-21-1	RBFT	SOS	Gaussian	0.20	0.84	35.14	0.143	5.983

Table S4 Characteristics of RBF and MLP-based ANNs and associated metrics for diameter model evaluation

Network Name	Algorithm	Error Function	Hidden activation	R²	RMSE	% RMSE	BIAS	% BIAS
MLP 10-11-1	**BFGS 196**	**SOS**	**Exponential**	**0.44**	**0.76**	**31.79**	**0.0019**	**0.079**
MLP 10-7-1	BFGS 80	SOS	Tanh	0.42	0.79	33.05	0.0022	0.092
MLP 10-5-1	BFGS 235	SOS	Logistic	0.43	0.78	32.63	0.0022	0.092
MLP 10-5-1	BFGS 66	SOS	Exponential	0.41	0.82	34.30	0.0025	0.104
MLP 10-6-1	BFGS 65	SOS	Logistic	0.42	0.78	32.63	0.0023	0.096
RBF 10-28-1	RBFT	SOS	Gaussian	0.16	1.73	72.38	0.142	5.941
RBF 10-27-1	RBFT	SOS	Gaussian	0.18	1.53	64.01	0.129	5.397
RBF 10-24-1	RBFT	SOS	Gaussian	0.05	2.61	109.20	0.298	12.468
RBF 10-18-1	RBFT	SOS	Gaussian	0.03	2.72	113.80	0.301	12.594
RBF 10-21-1	RBFT	SOS	Gaussian	0.09	1.99	83.26	0.281	11.757