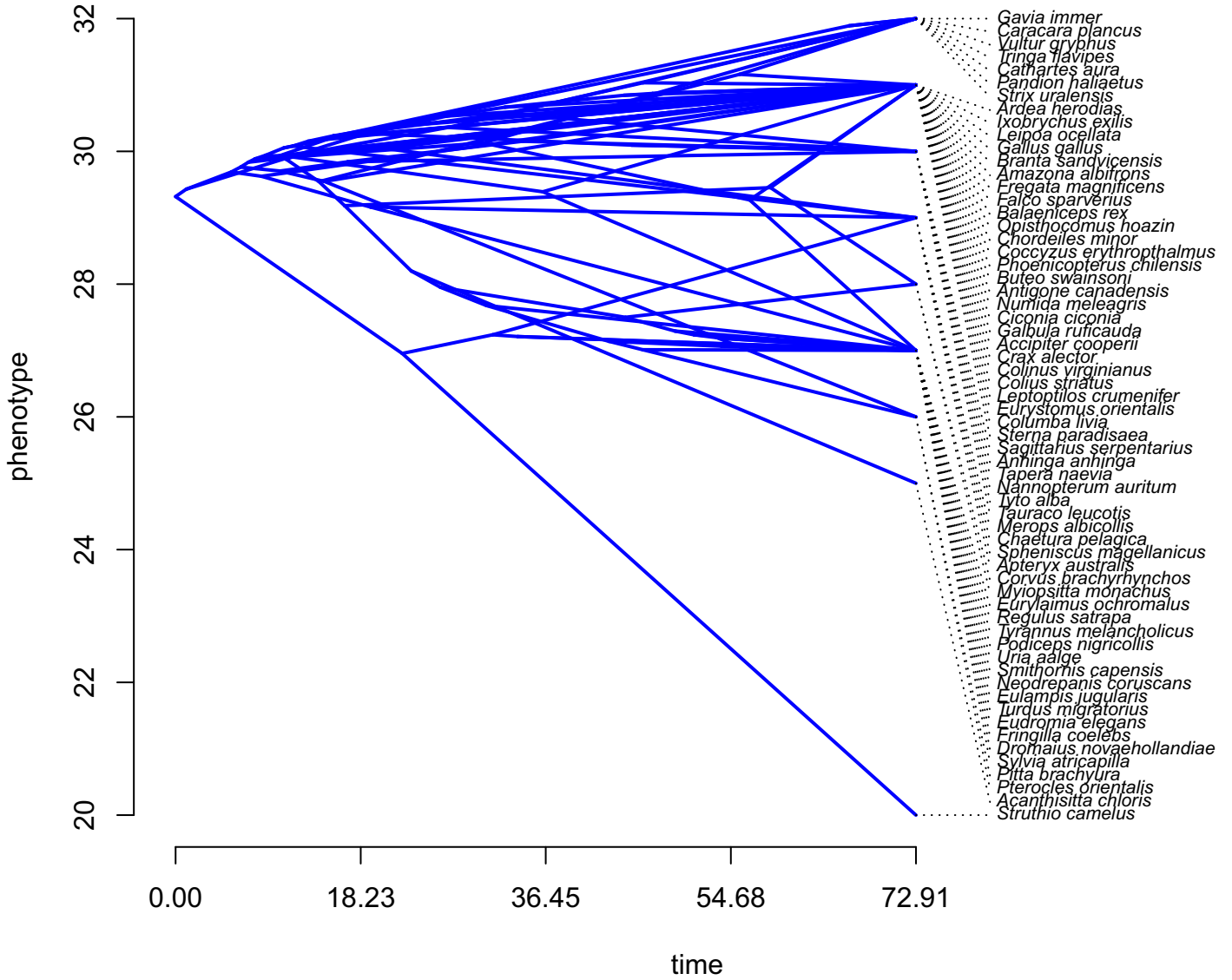
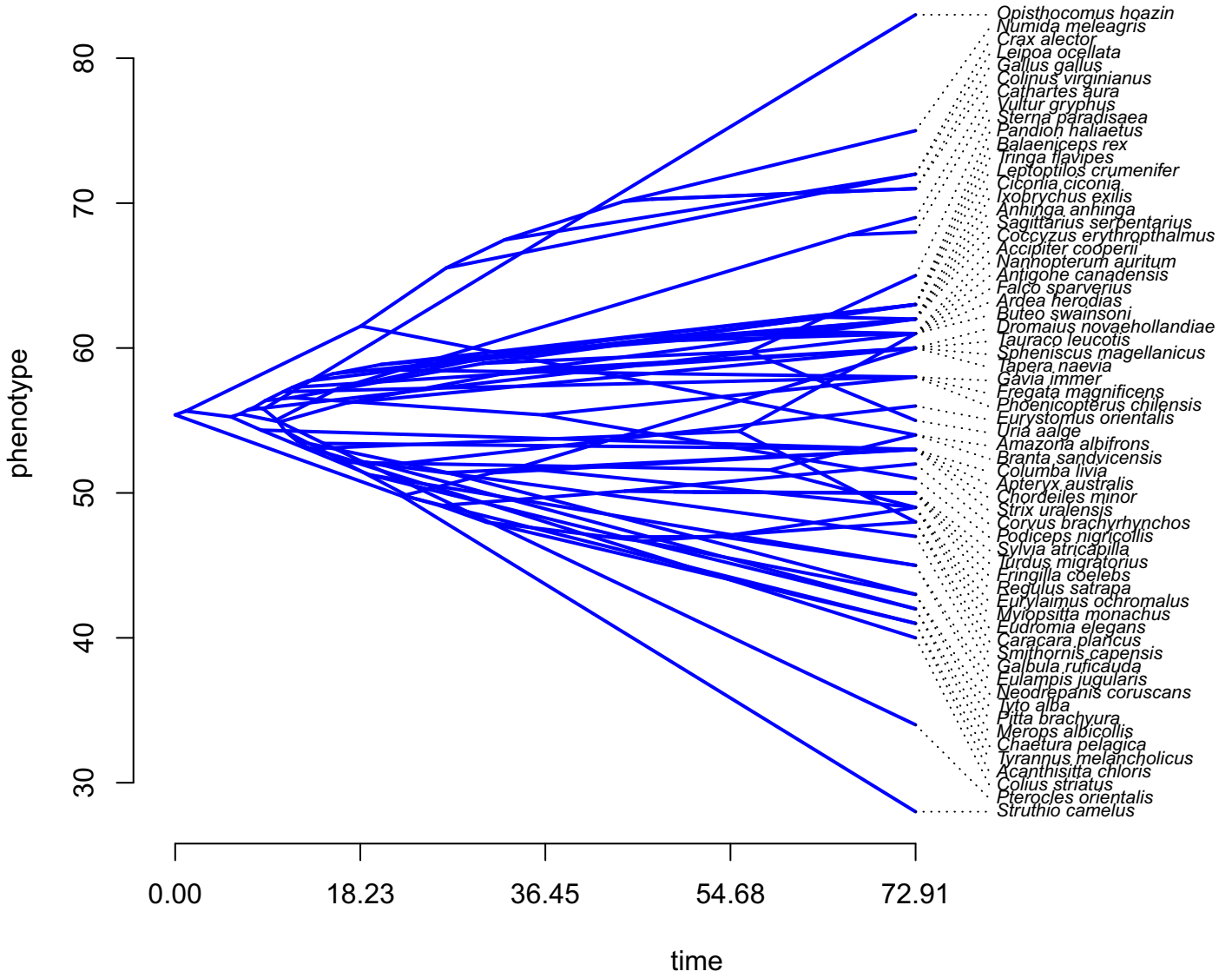
**Supplementary Data 13. Phenograms of network parameters**

a. The number of nodes (N) are lower in Passeriformes and Palaeognathae, with the lowest N value in *Struthio*. The highest N values are found in Cathartiformes, *Tringa*, *Gavia*, *Pandion*, *Strix* and *Caracara*.
b. The number of connections (L) are lower in *Colius*, *Pterocles*, and *Struthio*, which has the lowest L value. The highest L values are found in Cathartiformes, Galliformes and *Opisthocomus*, with *Opisthocomus* having the highest L value.
c. The phenogram of density of connections (D) displays more dispersion for the species at the tip-values than in most other species, with the highest D values observed in *Opisthocomus* and *Dromaius*, and the lowest D value in *Colius*. Notable differences are observed between *Caracara* (with a low D value) and *Falco* (with a D mid-value), and also between *Amazona* and *Myiopsitta* (both exhibiting D mid-values), and between *Sterna* (with a D mid-value) and *Uria* (with a D high value).
d. The average clustering coefficient (ACC) has the lowest values in *Pterocles*, while the highest ACC values are in *Sterna* and *Uria*. Notable differences are observed again between *Caracara* (which has a mid-low ACC value) and *Falco* (which has a mid-high ACC value).
e. The phenogram of average path length (APL) is most distinguished by the difference between *Opisthocomus* and the rest of the species. Apart from this, the plot reveals a significant difference between *Pterocles* with the highest APL value and the rest of the species, as well as notable differences between *Caracara* and *Falco*, and between *Struthio* and *Dromaius* (the latter having the lowest APL value besides *Opisthocomus*).
f. The phenogram of heterogeneity (H) displays a gradient from the lower to the mid-high value, followed by a gap between *Columba*, which has the highest H value, and the rest of the species. Numerous vertical separations are observed between closely related taxa, with one of the most recent and widest separations being between *Amazona* (which has an H midvalue) and *Myiopsitta* (which has an H mid-low value).
g. Most birds occupy the middle values in the phenogram of the average degree (AD), with the exception of Galliformes and *Opisthocomus*, which display the highest AD values. The lowest values are found again in *Pterocles* and *Colius*. A notable difference is observed between *Caracara* (with an AD midlow value), and *Falco* (with an AD mid-value). A similar difference is observed between *Struthio* (with an AD mid-low value) and *Dromaius* (with an AD mid-high value), and between *Branta* (with an AD mid-value) and Galliformes (with high AD values).
h. The network diameter (ND) values are the lowest in *Casuarius*, Galliformes, *Tauraco*, *Tapera*, *Columba* and *Opisthocomus*. The highest ND values are found in *Pterocles* and *Phoenicopterus*.
i. The parcellation (PA) phenogram displays a gradient between the highest value, found in *Eudromia*, and the mid-low PA values found in the rest of the species. The lower end of the gradient is occupied by *Amazona*, which is notably separated from *Myiopsitta*, which has a moderately high PA value. There is a gap between the mid-low PA value of *Amazona* and the lower ones, which are Accipitridae and *Falco*. The latter is greatly separated from *Caracara*, which has one of the highest PA values.

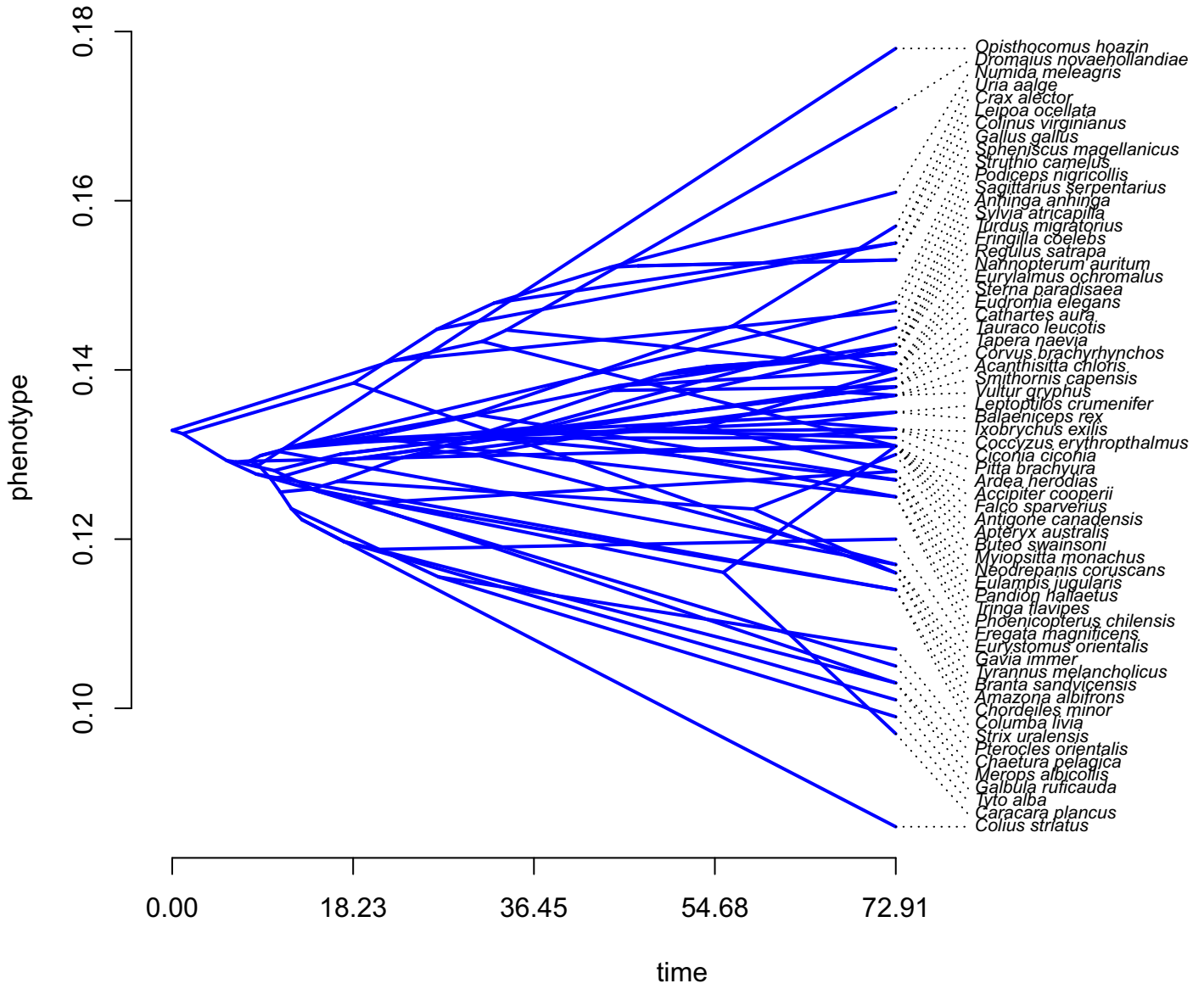
**a** Number of nodes (N)



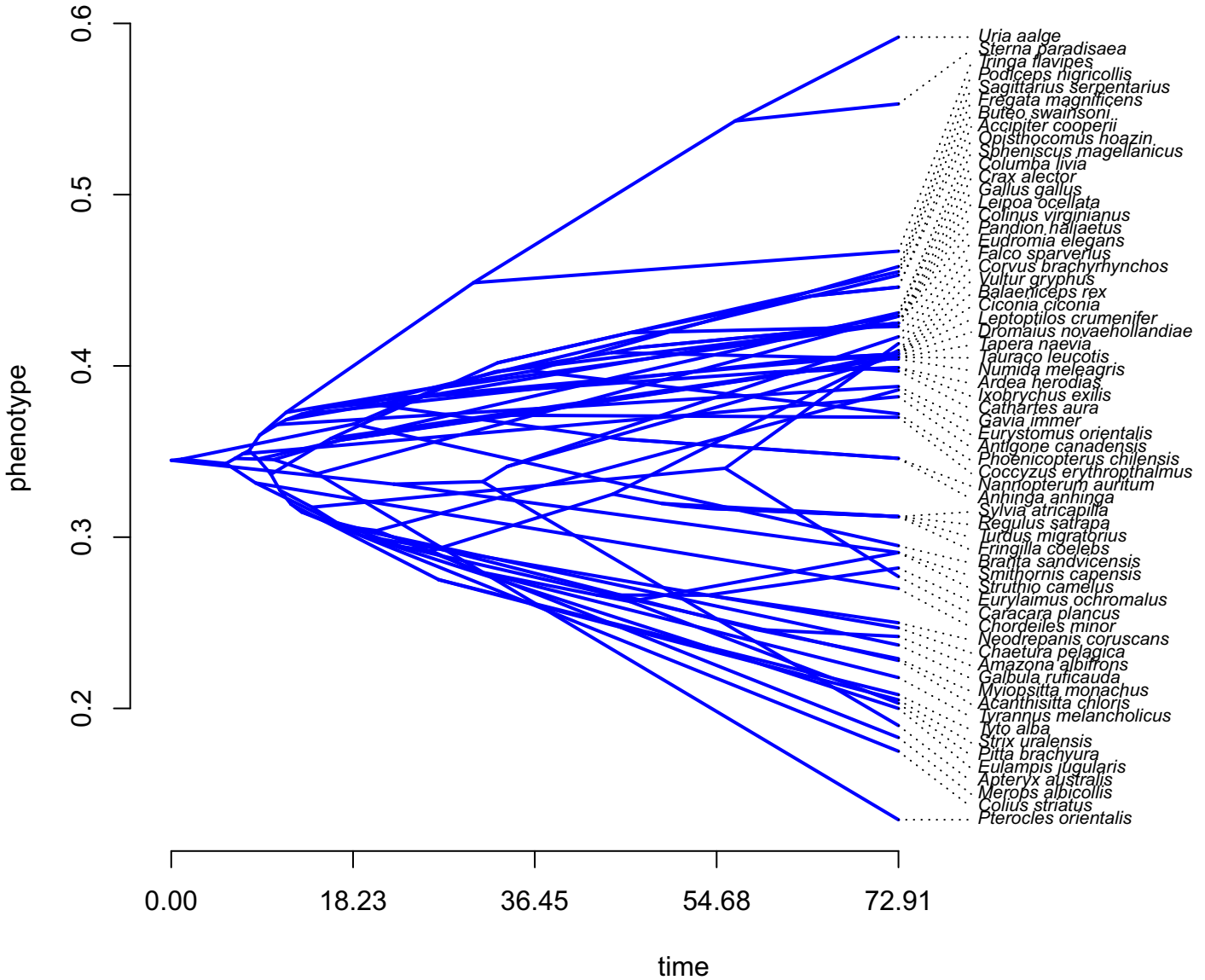
**b** Number of connections (L)



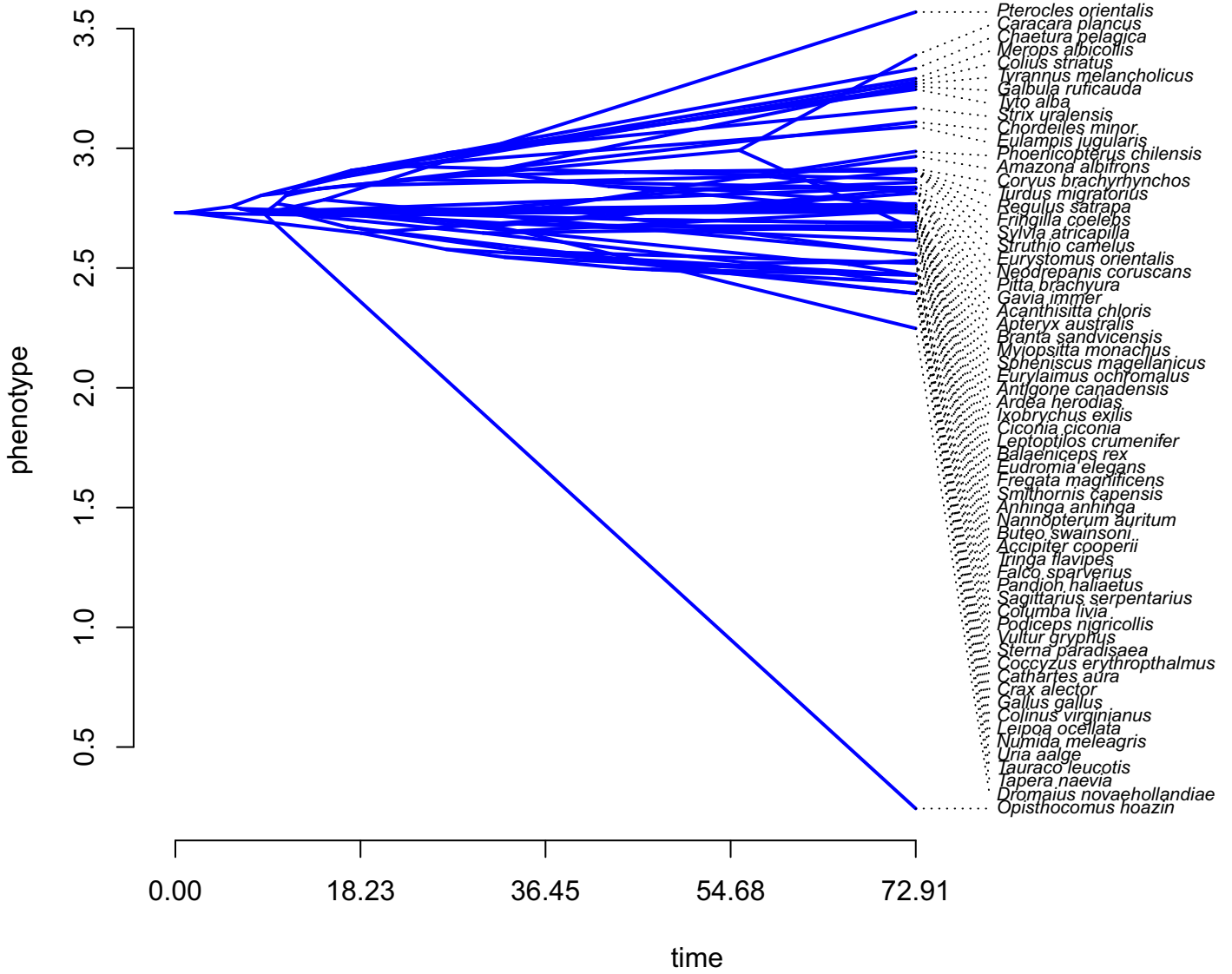
**c** Density of connections (D)



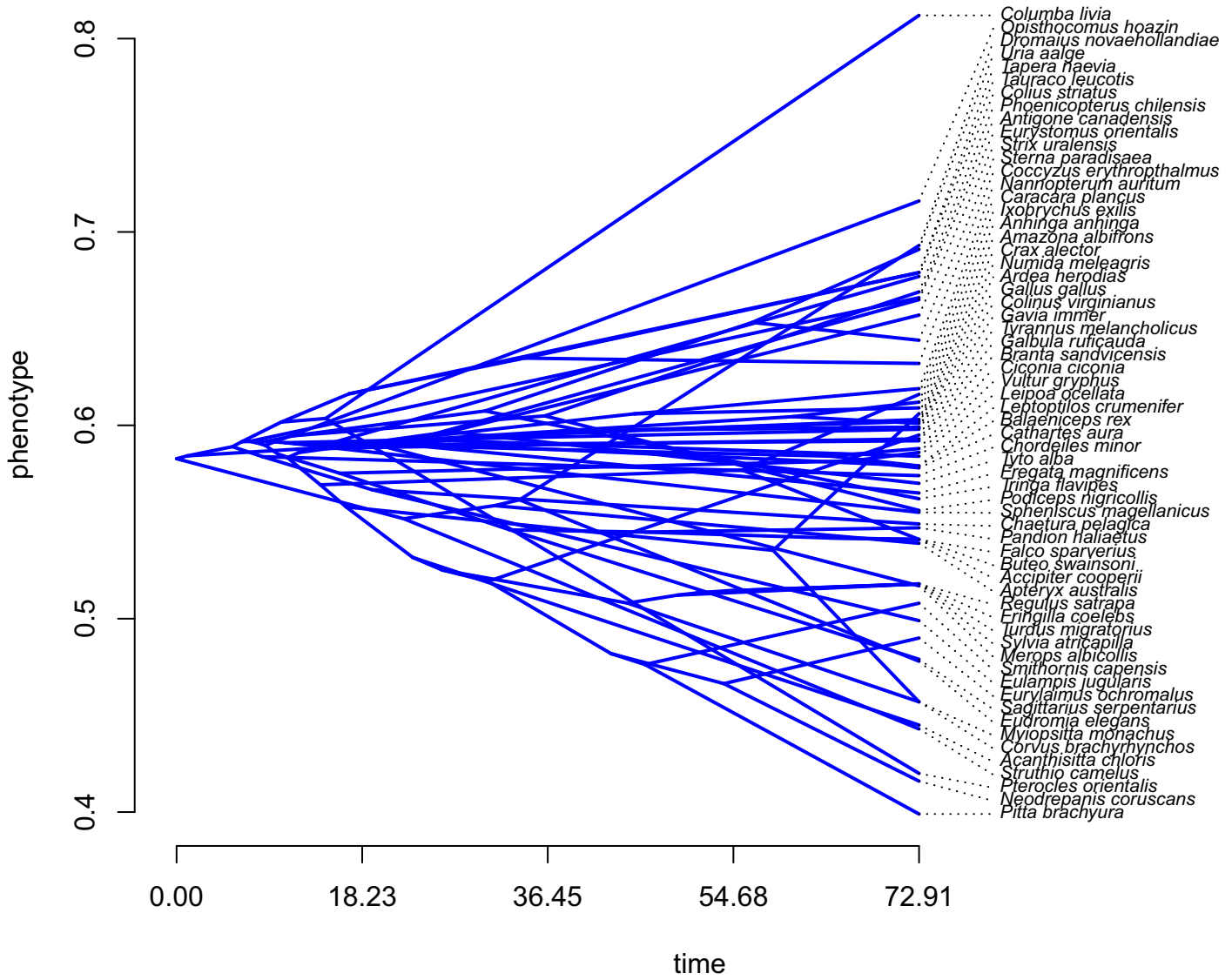
**d** Average clustering coefficient (ACC)



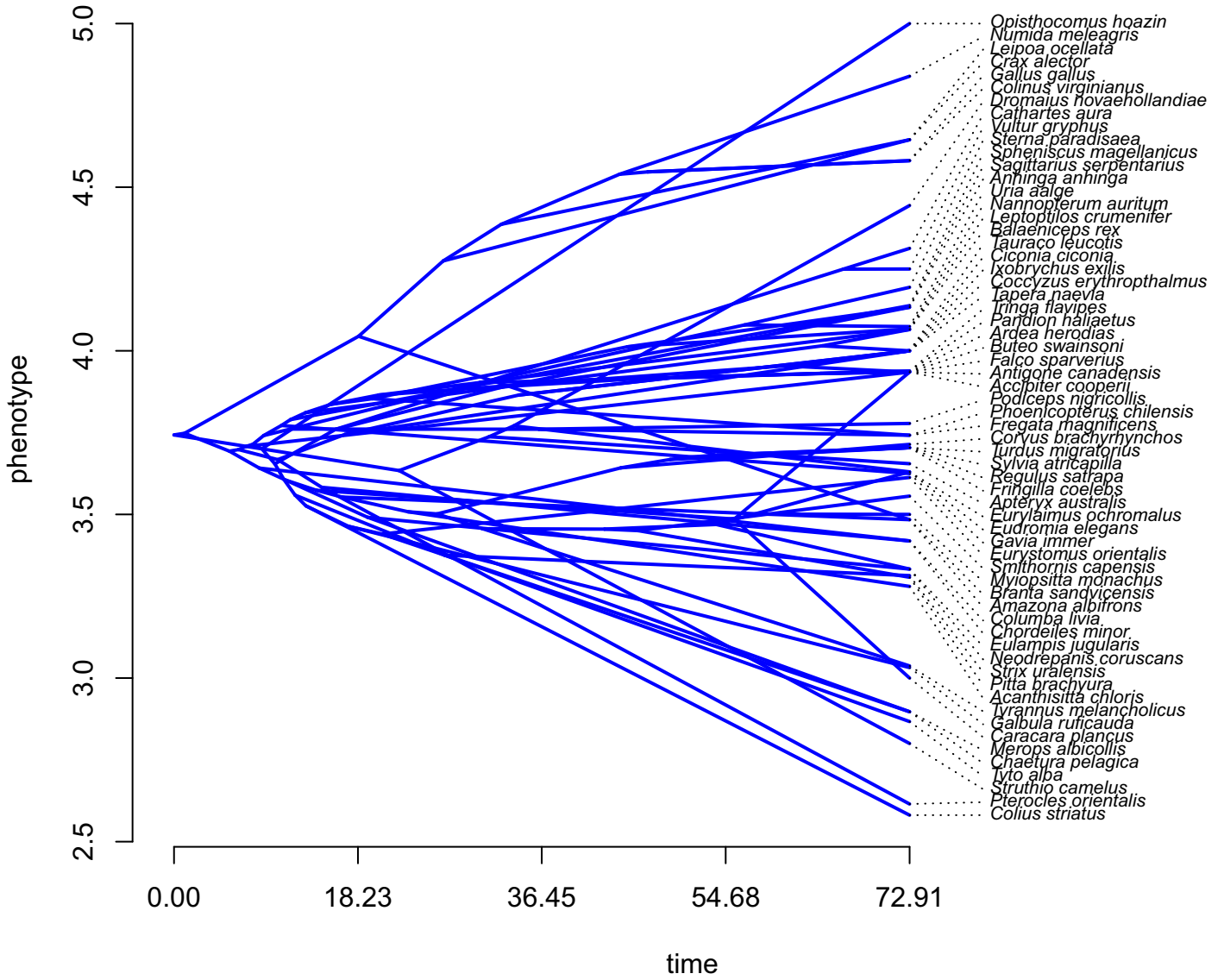
**e** Average path length (APL)



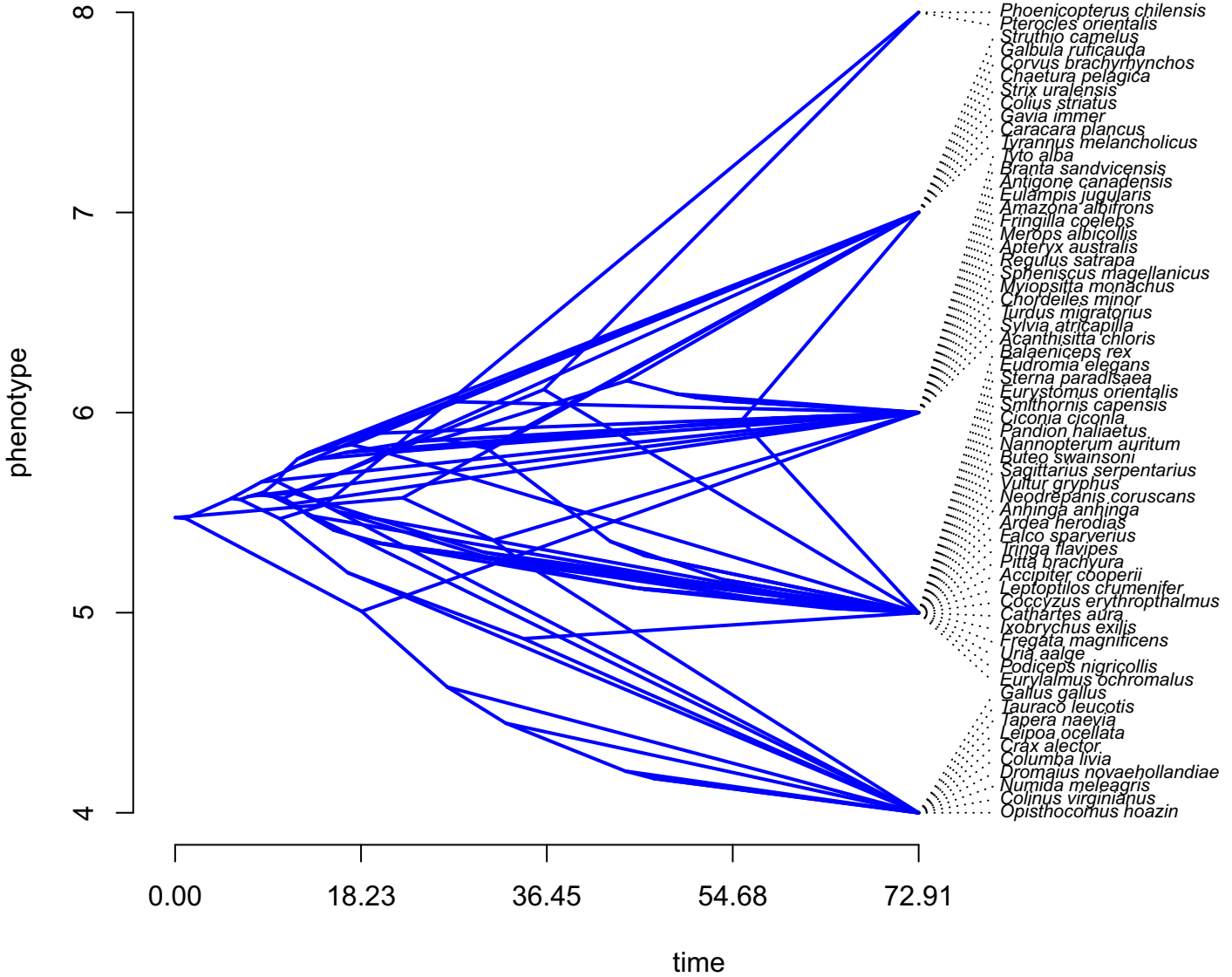
**f** Heterogeneity (H)



**g** Average degree (AD)



**h** Network diameter (ND)



**i** Parcellation (PA)