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Supplementary Material

Fig. S1 - The representation of the in-degree metric with nodes colored according to each species and their sizes scaled according to their values.

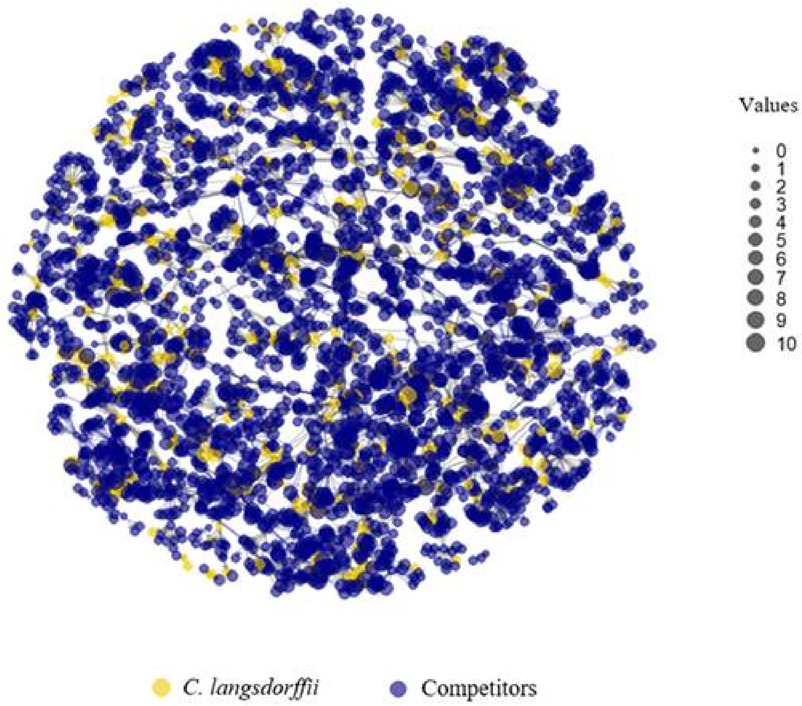


Fig. S2 - The representation of the out-degree metric with nodes colored according to each species and their sizes scaled according to their values.

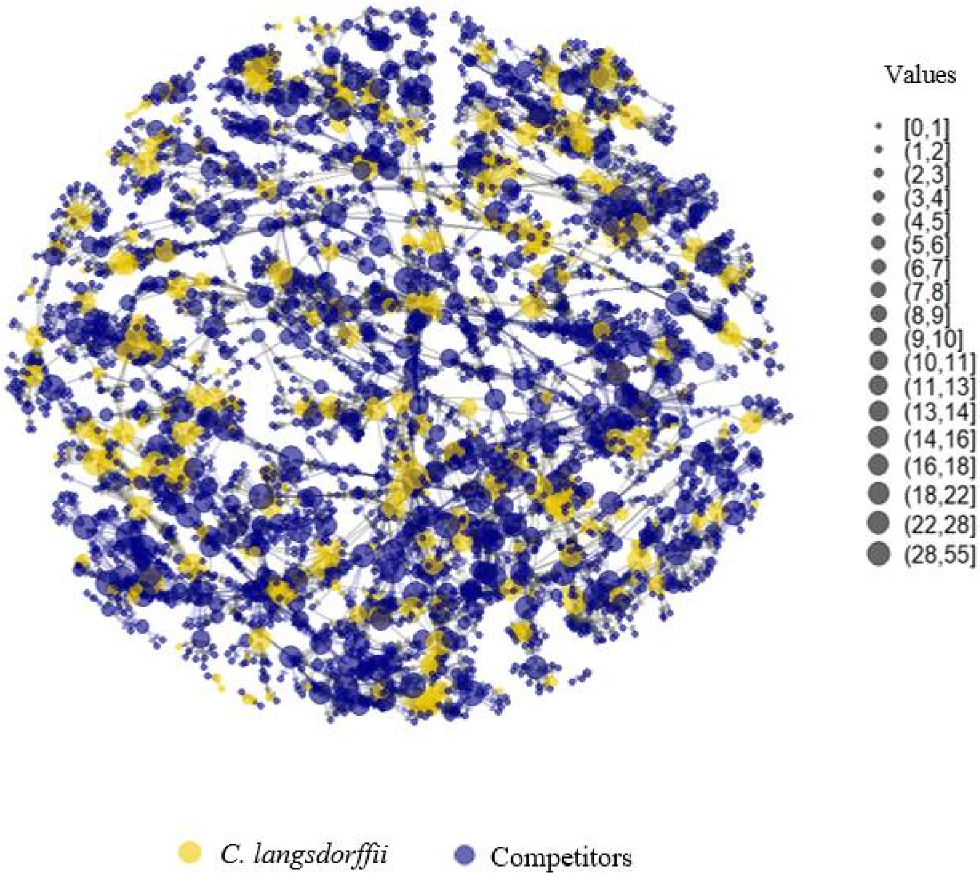


Fig. S3 - The representation of the total degree metric with nodes colored according to each species and their sizes scaled according to their values.

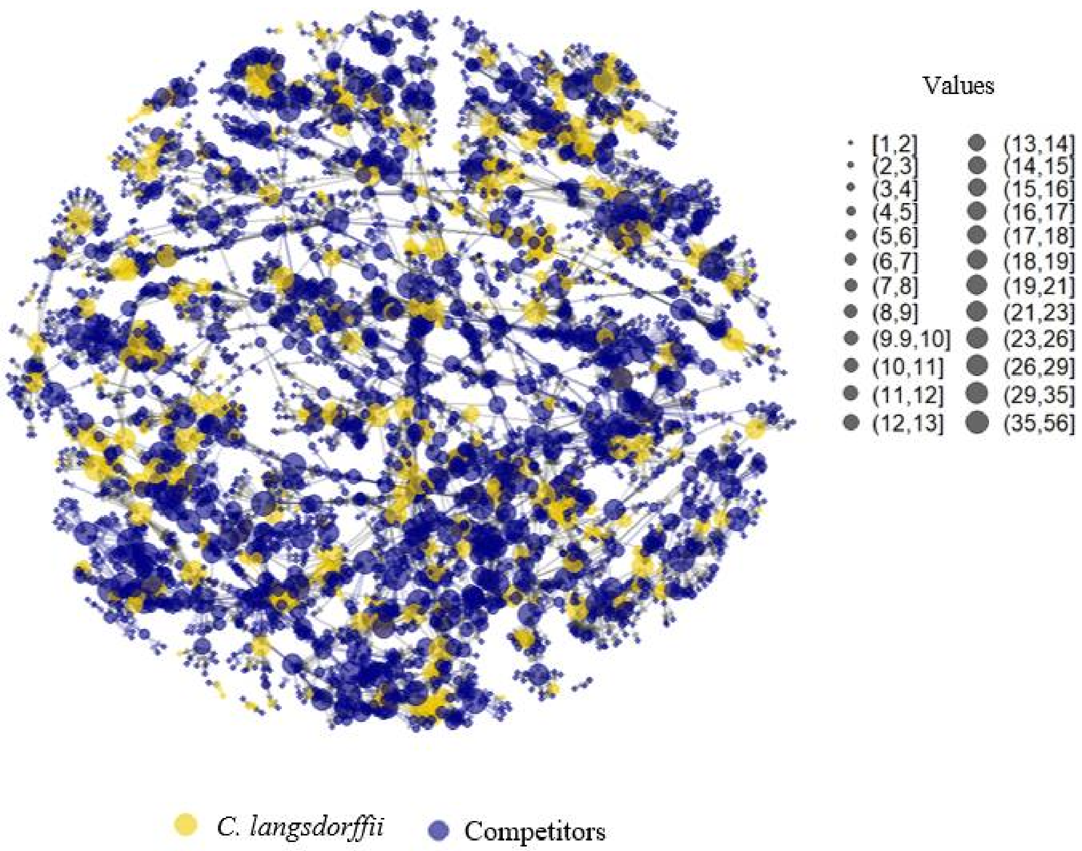


Fig. S4 - The representation of the nearest neighbors degree with nodes colored according to each species and their sizes scaled according to their values.

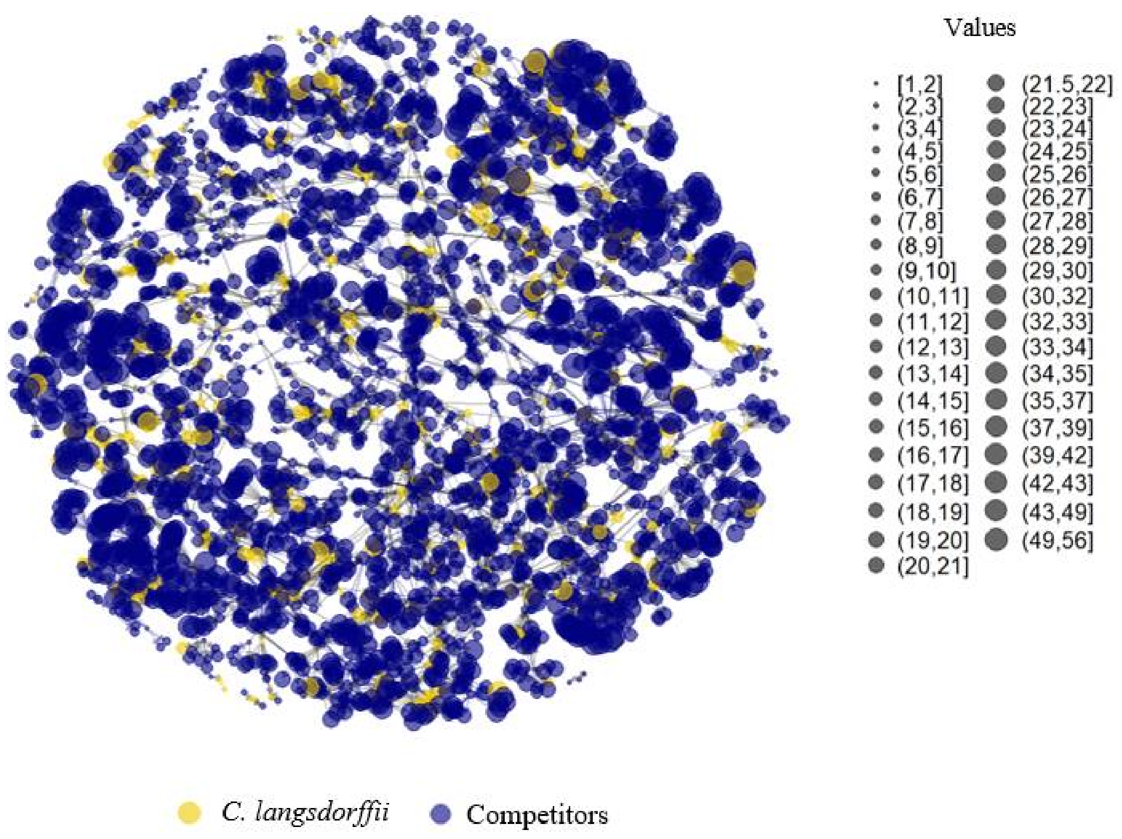


Fig. S5 - The representation of the eigenvector centrality with nodes colored according to each species and their sizes scaled according to their values.

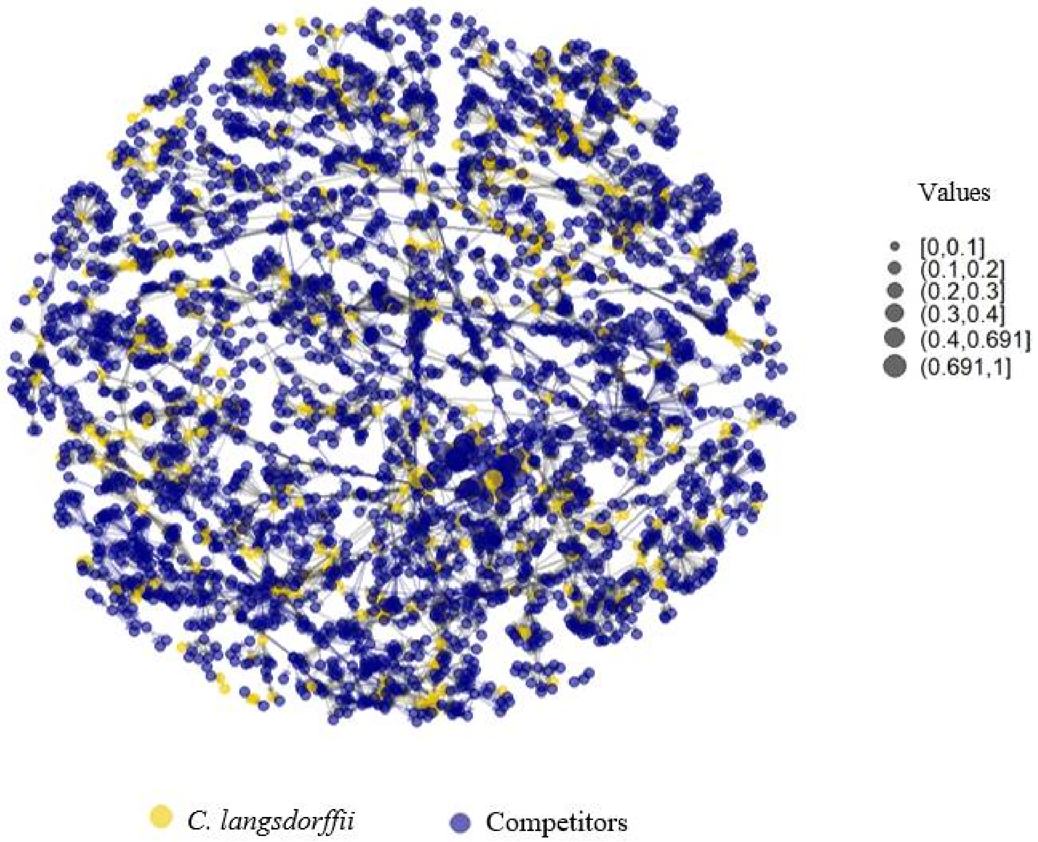


Fig. S6 - The representation of the closeness centrality with nodes colored according to each species and their sizes scaled according to their values.

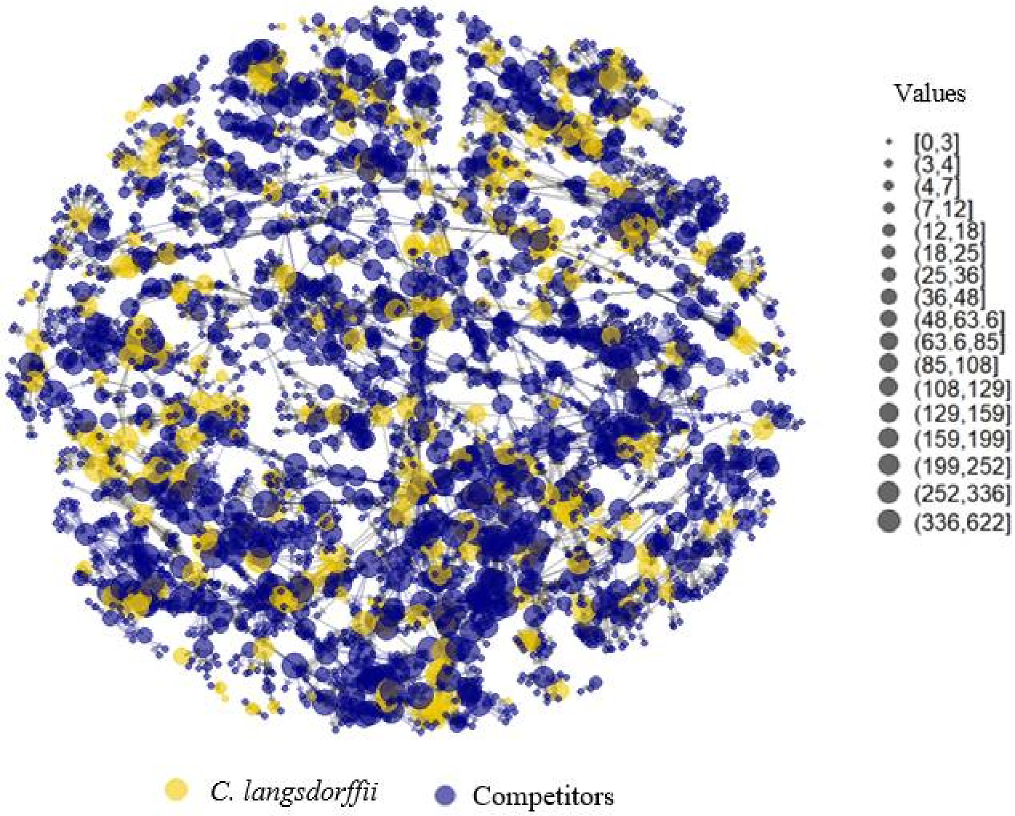


Fig. S7 - The representation of the coreness with nodes colored according to each species and their sizes scaled according to their values.

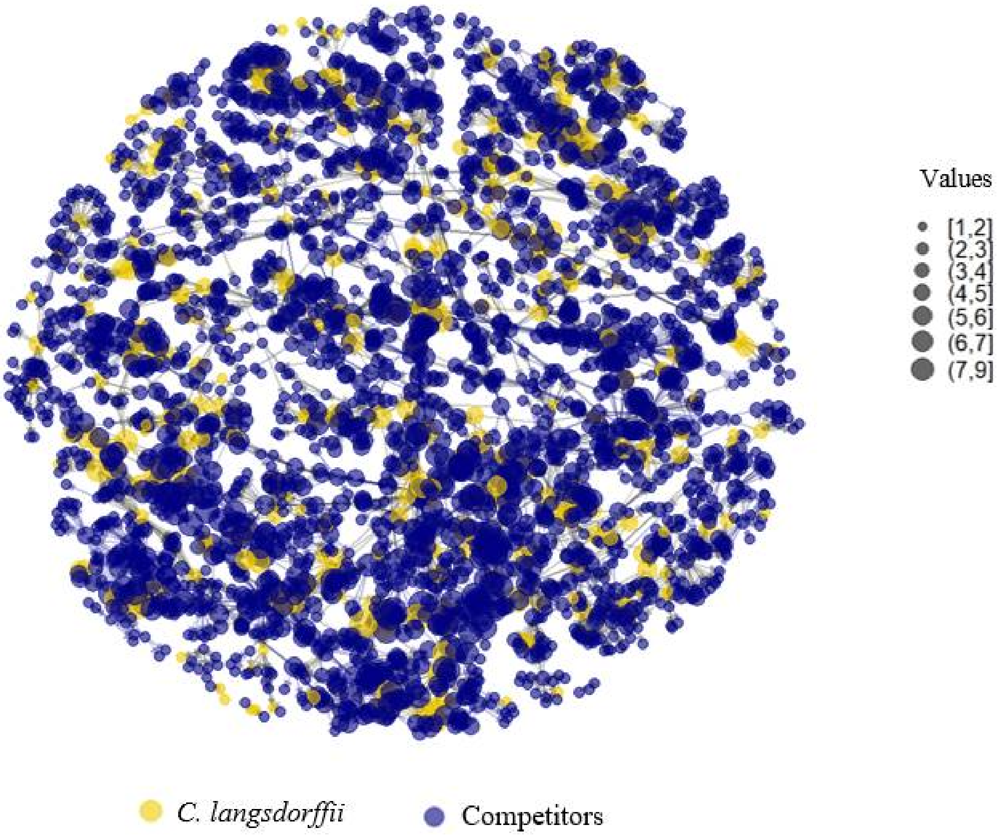


Fig. S8 - The representation of the clustering coefficient with nodes colored according to each species and their sizes scaled according to their values.

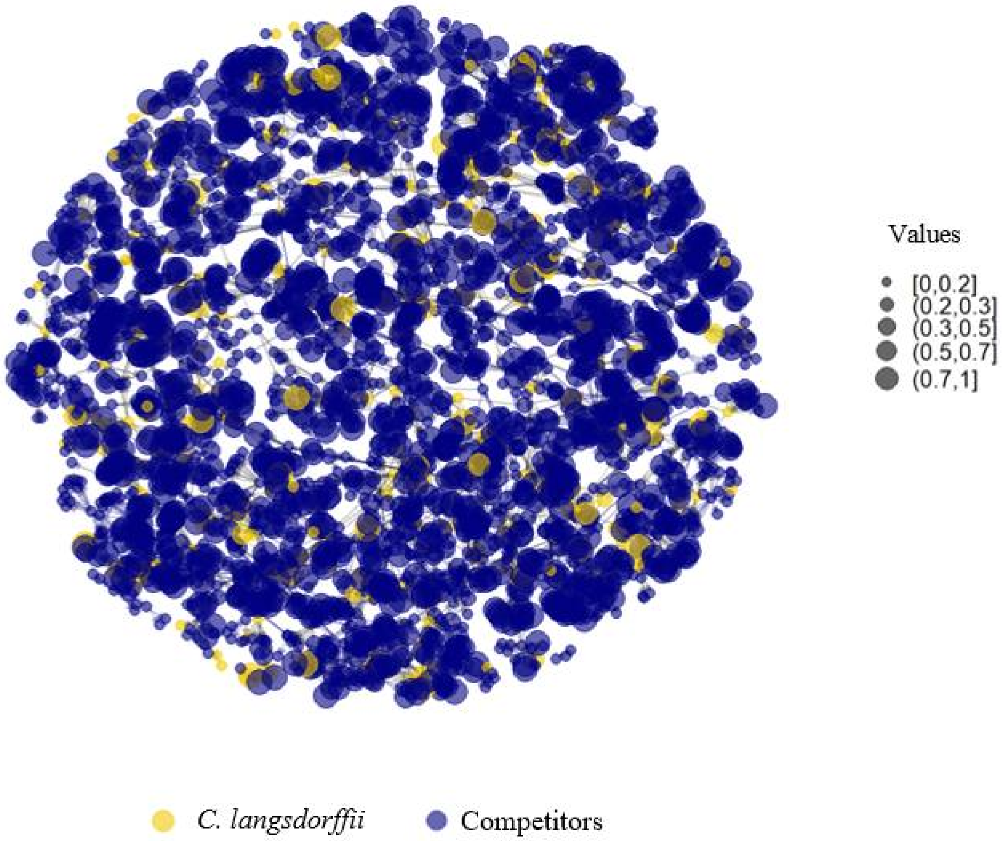
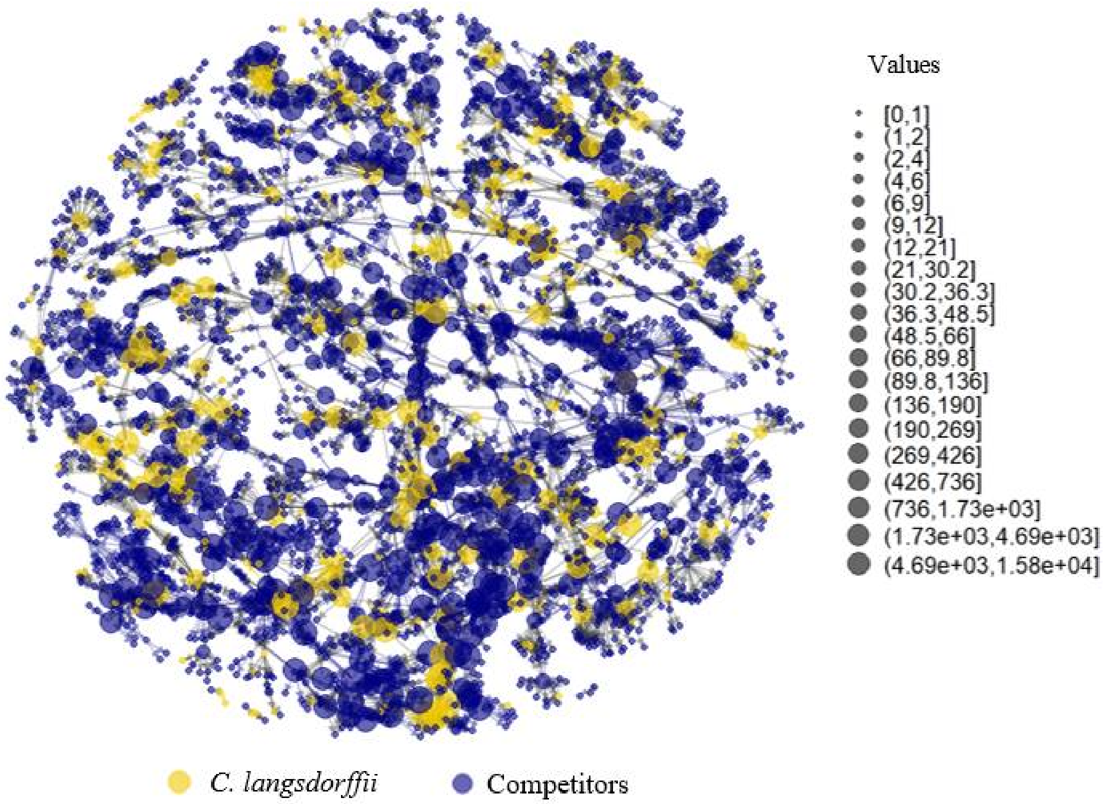


Fig. S9 - The representation of the betweenness centrality with nodes colored according to each species and their sizes scaled according to their values.



Tab.S1 - Ecological interpretations of Complex Network metrics for tree competition.

Metric	Ecological Interpretation	Meaning	Example
k_{in} (In-degree)	Number of times the subject tree acts as a competitor	Indicates the competitive impact the subject tree has on others	- Low: Trees with few direct competitors. - High: Trees with many direct competitors.
k_{out} (Out-degree)	Number of competitors competing with the subject tree	Shows the competitive pressure acting on the subject tree	- Low: Trees with few competitors. - High: Trees facing many competitors.
k (Total Degree)	Total number of competition relations (in-degree + out-degree)	Measures the intensity of competitive interactions the tree is involved in	- Low: Trees in environments with few competitive interactions. - High: Trees in environments with high competition.
k_{nn} (Average neighbors' degree)	Average number of competitors of the competitors of the subject tree	Evaluates the local competitive context, indicating if the tree is in an area with high indirect competition	- Low: Trees in areas with low competitive interaction among competitors. - High: Trees in areas with high competition between their competitors.
Eigenvector Centrality	Importance of the tree based on the influence of its competitors	Shows the competitive relevance based on the strength of its competitors	- Low: Trees with limited influence in competition. - High: Trees highly influential due to the competitive strength of their competitors.
Closeness Centrality	Competitive proximity to all other trees in the network	Indicates the tree's ability to rapidly sense competitive changes, such as resource release nearby	- Low: Trees on the periphery of the competitive network. - High: Trees close to the center of competitive dynamics.
Betweenness Centrality	Number of times the tree connects competitor groups	Reveals the tree's role as a competitive bridge, influencing the flow of competition between groups	- Low: Trees with little role in connecting different competitor groups. - High: Trees with a central role in connecting different competition groups.
Coreness (k-core)	Participation in dense competitive cores,	Indicates the tree's location in highly competitive	- Low: Trees in areas with low competition (e.g., k = 1).

Metric	Ecological Interpretation	Meaning	Example
	where all trees face at least k competitors	environments, with intense local interactions	- High: Trees in high-competition cores (e.g., $k \geq 3$).
Clustering Coefficient	Competitive clustering around the tree, showing whether its competitors also compete with each other	Reveals a dense competitive network indicating intense local competition for resources	- Low: Trees in areas with dispersed competition and fewer connections. - High: Trees in areas with highly concentrated competition among local groups.

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Tab. S2 - Inter-tree competition indexes applied for *Copaifera langsdorffii* trees.

	Distance-dependent indices (DD)	
Code	**Authors**	**Formulas**
DD1	Hegyi (1974)	$\sum_{j=1}^{n}(d_j / d_i l_{ij})$
DD2	Rouvinen and Kuuluvainen (symmetric, 1997)	$\sum_{j=1}^{n} d_j / l_{ij}$
DD3	Rouvinen and Kuuluvainen (asymmetric, 1997)	$\sum_{j=1}^{n} \frac{(d_j / d_i)^2}{l_{ij}}$
DD4	Martin and Ek (1984)	$\sum_{j=1}^{n} \frac{d_j}{d_i} \frac{1}{(l_{ij}+1)}$
DD5	Staebler (1951)	$\sum_{j=1}^{n} l_{ij}$
DD6	Moore et al. (1973)	$\sum_{j=1}^{n} \frac{d_i^2}{d_i^2 + d_j^2} \quad l_{ij}$
	Distance-independent indices (DI)	
DI1	Daniels et al. (1986)	$(d_i^2 n) / \sum_{j=1}^{n} d_j^2$
DI2	Mugasha (1989)	$\frac{\sum_{j=1}^{n}(d_j / d_i)}{n}$
DI3	Lorimer (1983)	$\sum_{j=1}^{n} d_j / d_i$
DI4	Looney et al. (2018)	$\sum_{j=1}^{n} d_j$
DI5	Corona and Ferrara (1989)	$\sum_{j=1}^{n}(d_j^2 / d_i^2)$
DI6	Tomé and Burkhart (1989)	d_i / d_{max}
DI7	Glover and Hool (1979)	$d_i^2 / \overline{d}^2$
DI8	Stage (1973)	d_i / d_q

DI9	Pedersen et al. (2013)	d_q / d_i
DI10	Stage (1973)	SA_i^2 / SA_q^2
DI11	Stage (1973)	BAL_i
Semi-distance-independent indices (SI)		
SI1	Stage (1973)	$SA_i^2 / SA_{q_n}^2$
SI2	Glover and Hool (1979)	$d_i^2 / \bar{d}_n^2$

Where: d_i = diameter of the *i*-th subject tree, measured at 1.30 m – dbh (cm); d_j = diameter of the *j*-th competitor tree, measured at 1.30 m – dbh (cm); l_{ij} = distance between the subject tree *i* and its competitor *j* (m); n = number of competitor trees; $d_{\max}$ = maximum dbh of the trees in the sample plot (cm); $\bar{d}$ = arithmetic mean of dbh for trees in sample plot (cm); d_q = quadratic mean diameter (q) of sample plot (cm); SA_i = sectional area of the *i*-th subject tree (m²); SA_q = sectional area corresponding to the quadratic mean diameter (q) of the boles in sample plot (m²); BAL_i = sum of sectional areas of neighbor trees with larger boles than the subject tree *i*; SA_{q_n} = sectional area corresponding to the quadratic mean diameter (q) of the *n* competing trees of the subject tree ; $\bar{d}_n$ = arithmetic mean of the dbh of the *n* competing trees of the subject tree.