

Table S1. Characteristics of the plots and the sampling trees *B. ermanii* (mean  $\pm$  standard deviation; n = 5 trees), *P. jezoensis* (mean  $\pm$  standard deviation; n = 5 trees) located in the Changbai Mountain.

Species	Elevation (m)	Temperature (°C)	DBH (cm)	High (m)
<i>B. ermanii</i>	2200	9.88	1.1 $\pm$ 0.1a	1.0 $\pm$ 0.1
	2100	10.68	1.1 $\pm$ 0.1a	1.5 $\pm$ 0.1
	2000	11.50	4.8 $\pm$ 0.4	4.1 $\pm$ 0.1
	1900	12.04	9.4 $\pm$ 1.0	9.3 $\pm$ 0.4
	1800	12.58	9.2 $\pm$ 0.7	9.2 $\pm$ 0.5
	1700	13.12	10.9 $\pm$ 0.7	11.2 $\pm$ 0.9
<i>P. jezoensis</i>	1800	12.58	24.5 $\pm$ 1.2	10.8 $\pm$ 0.5
	1700	13.12	24.7 $\pm$ 1.3	10.9 $\pm$ 0.5
	1600	13.57	24.6 $\pm$ 1.2	11.0 $\pm$ 0.5
	1500	13.94	24.5 $\pm$ 1.4	10.5 $\pm$ 0.7
	1400	14.31	24.2 $\pm$ 0.9	10.7 $\pm$ 0.6
	1300	14.68	23.8 $\pm$ 0.9	11.1 $\pm$ 0.9

Table S2. Primary parameters of the leaf trait network.

	Parameters	Definition	Ecological significance
Overall parameters			
	Average Degree (AK)	AK is the number of edges that connect a focal node trait to other nodes.	A high AK indicates a dense network where nodes (e.g., species or traits) are highly connected. This suggests high interaction potential, which may enhance ecosystem stability or cooperation among species
	Diameter (D)	D refers to the maximum shortest path length between any two connected traits in the network.	A smaller network diameter suggests that the connections between species or functions within the ecosystem are tighter, allowing reactions or regulations to propagate quickly and coherently throughout the network. This typically means that the ecosystem can respond more swiftly and cohesively to external disturbances, potentially enhancing its stability and adaptability.
	Modularity (M)	M reflects the specialized, function-driven connectivity of plant traits within modules.	A higher modularity represents clear boundaries of functional modules, strong connections within functional modules and weak connections between functional modules. It means that modules composed of specific traits perform specific functions, which gives plants greater freedom and flexibility to cope with harsh environments and thus higher stress tolerance
Node parameters			
	Degree (k)	k was defined as the sum of edges that connect the focal node traits to other	The trait with the most connections to other traits in the network has the highest

nodes, and the number of connections and the strength of relationships influence the degree of trait.

degree and is the 'hub' trait in the network, which may play a central regulatory role in influencing the overall phenotype

Closeness  
(C)

C was defined as the reciprocal of the mean shortest path between a focal node trait and all other nodes in LTNS.

Traits with higher C refer to the traits closely related to other traits in the network

Betweenness  
(B)

B was defined by the number of shortest paths going through a focal node trait.

A high betweenness for a trait that the trait is a "bridge" or "mediator" between functional modules, and that environmental screening for the trait can greatly influence the coordination of multiple functional modules.

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