Table S1, Fig. 3 (A) The annual total difference in tree carbon stock density of each plot (t ha^{-1}). (B) The annual total difference in tree volume of each plot (m^3).

Thinning intensity (%)	Number of trees (n)	Annual total difference tree carbon (%)	Annual total difference tree volume (m^3)
0	73	9.28	36.93
10	53	9.50	38.10
11	59	10.28	40.52
16	50	10.37	42.40
18	55	11.13	44.99
22	50	7.99	32.96

Table S2, Fig. 4 (A, B) Average annual growth rate of DBH and height of trees in each plot. The data in the table are "mean ± SE".

Thinning intensity (%)	Number of trees (n)	Growth rate of DBH (%)	Growth rate of height (%)
0	73	1.96 ± 0.12	6.28 ± 0.4
10	53	2.27 ± 0.13	7.46 ± 0.5
11	59	2.47 ± 0.14	9.17 ± 0.5
16	50	2.54 ± 0.13	9.32 ± 0.4
18	55	2.57 ± 0.14	9.70 ± 0.4
22	50	2.55 ± 0.1	5.56 ± 0.4

Table S3, Fig. 5(A) Average carbon content (g/kg) in soil of different layers under different thinning intensity. The data in the table are "mean ± SD". Average carbon stock in three soil layers of each plot. Different letters next to numbers indicate significant differences (p <0.001, Tukey's HSD test) among the same soil layer with different thinning intensities.

Thinning (%)	0 – 20 cm	20 – 40 cm	40 – 60 cm
0	22.68 ± 1.55^{abc}	8.68 ± 0.66^{de}	4.54 ± 0.75^{f}
10	21.30 ± 2.04^{bc}	11.65 ± 1.15^{d}	8.70 ± 0.39^{de}
11	24.96 ± 2.41^{ab}	7.00 ± 0.37^{ef}	7.16 ± 1.58^{ef}
16	19.49 ± 0.86^{c}	8.19 ± 0.61^{def}	5.27 ± 0.63^{ef}
18	19.49 ± 2.73^{c}	8.15 ± 1.55^{def}	6.22 ± 1.29^{ef}
22	26.73 ± 5.01^{a}	8.29 ± 0.80^{def}	5.08 ± 0.60^{ef}

Table S4, Fig. 5(B) Average bulk density (g/cm^3) in soil of different layers under different thinning intensity. The data in the table are "mean ± SD". Different letters next to numbers indicate significant differences at the (p <0.001, Tukey's HSD test) level among the average bulk density in soil with different thinning intensities.

Thinning (%)	0 – 20 cm	20 – 40 cm	40 – 60 cm
0	1.20 ± 0.12^{abc}	1.44 ± 0.19^{ab}	1.43 ± 0.15^{ab}
10	1.01 ± 0.07^{c}	1.30 ± 0.15^{abc}	1.33 ± 0.07^{ab}
11	1.21 ± 0.12^{abc}	1.38 ± 0.06^{ab}	1.48 ± 0.18^{ab}
16	1.15 ± 0.12^{abc}	1.27 ± 0.14^{abc}	1.40 ± 0.10^{ab}
18	1.18 ± 0.11^{bc}	1.48 ± 0.07^{ab}	1.50 ± 0.20^{a}
22	1.26 ± 0.19^{abc}	1.49 ± 0.07^{a}	1.44 ± 0.13^{ab}

Table S5, Fig. 6 (A) Average carbon content of vegetation (g/kg) of different layers under different thinning intensity. The data in the table are "mean ± SE". Different letters next to numbers indicate significant differences (p <0.001, Tukey's HSD test) among the same vegetation layer with different thinning intensities.

Thinning (%)	Upper layer	Middle layer	Lower layer
0	315.15 ± 13.6^{cdefg}	237.77 ± 11.9^{efg}	208.13 ± 21.1^{g}
10	479.39 ± 60.7^{ab}	392.93 ± 24.6^{abcd}	274.99 ± 7.06^{defg}
11	344.02 ± 15.7^{cdef}	263.27 ± 22.5^{efg}	194.92 ± 17.4^{g}
16	274.72 ± 29.8^{defg}	219.88 ± 26.3^{fg}	216.51 ± 16.3^{g}
18	365.71 ± 22.1^{abcde}	298.00 ± 28.4^{defg}	275.45 ± 35.7^{defg}
22	492.93 ± 23.3^{a}	437.00 ± 18.7^{abc}	354.42 ± 22.0^{bcde}

Table S6, Fig. 6(B) Average carbon content (g/kg) of shrub under different thinning intensity. The data in the table are "mean ± SE". Different letters next to numbers indicate significant differences level (p<0.001, Tukey's HSD test) among the average carbon of shrubs with different thinning intensities.

Thinning Intensity (%)	Carbon content (g/kg)
0	259.62 ± 19.8^{cd}
10	219.67 ± 11.0^{d}
11	317.72 ± 15.8^{bc}
16	301.76 ± 8.6^{c}
18	366.42 ± 17.1^{ab}
22	411.19 ± 19.2^{a}

Table S7. Carbon storage of different tree organs with different thinning treatments. The numbers in parentheses are the percentage of the carbon storage of each part in the total carbon storage.

Date	Thinning treatment %	Carbon storage of different organ (t ha^{-1})				
		Stem	Branch	Leaf	Root	Total (t ha^{-1})
After thinning (2019)	0	86.74 (89.11%)	4.33 (4.45%)	2.20 (2.26%)	4.07 (4.18%)	97.3
	10	70.47 (89.20%)	3.47 (4.49%)	1.79 (2.27%)	3.27 (4.14%)	79.00
	11	67.61 (88.09%)	3.49 (4.59%)	1.77 (2.32%)	3.27 (4.34%)	76.14
	16	67.96 (89.39%)	3.28 (4.31%)	1.72 (2.25%)	3.08 (4.04%)	76.03
	18	67.48 (89.09%)	3.38 (4.46%)	1.74 (2.29%)	3.16 (4.16%)	75.75
	22	70.91 (89.54%)	3.35 (4.24%)	1.76 (2.22%)	3.17 (4.00%)	79.19
September 2023	0	120.92 (89.93%)	5.44 (4.04%)	2.78 (2.07%)	5.31 (3.95%)	134.45
	10	105.53 (90.21%)	4.56 (3.89%)	2.38 (2.03%)	4.52 (3.86%)	116.99
	11	105.42 (89.91%)	4.73 (4.03%)	2.43 (2.07%)	4.67 (3.97%)	117.25
	16	106.25 (90.42%)	4.45 (3.78%)	2.37 (2.01%)	4.44 (3.78%)	117.50
	18	108.55 (90.26%)	4.65 (3.87%)	2.43 (2.02%)	4.63 (3.84%)	120.27
	22	100.42 (90.34%)	4.25 (3.82%)	2.26 (2.03%)	4.22 (3.79%)	111.16

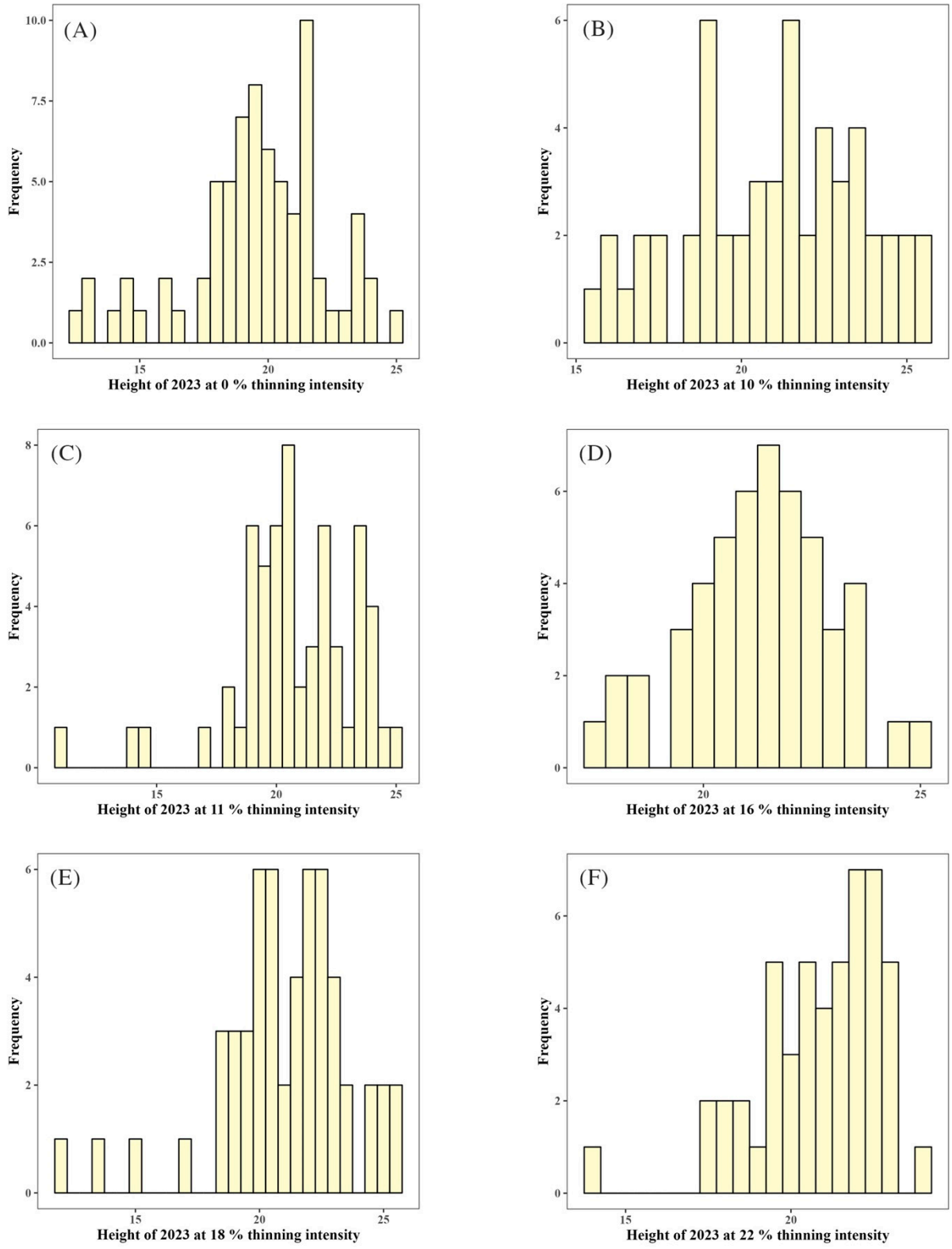

Figure S1: Histogram of distribution height of trees in different thinning intensities in 2023. This histogram is constructed to explore whether the data were normally distributed or not.