

The effect of wildfire on radial growth of Scots pine (*Pinus sylvestris* L.) in Slitere National Park

Māra Kitenberga, Roberts Matisons, Ieva Jaunslaviete, Didzis Elferts
Latvian State Forest Research Institute 'Silava', Rigas iela 111, Salaspils, LV-2169, Latvia

- The objective of this study was to assess the effects of non-lethal wildfire on the subsequent formation of the increment of Scots pine and its sensitivity growing in nutrient-poor sandy soil conditions in the hemiboreal forest zone.
- The data analysis is based on tree-ring width (TRW) time series from 48 trees (burned site in 1992), and 23 trees from the control site (unburned site located nearby).
- The analysis was conducted over the common period 1970–2014.

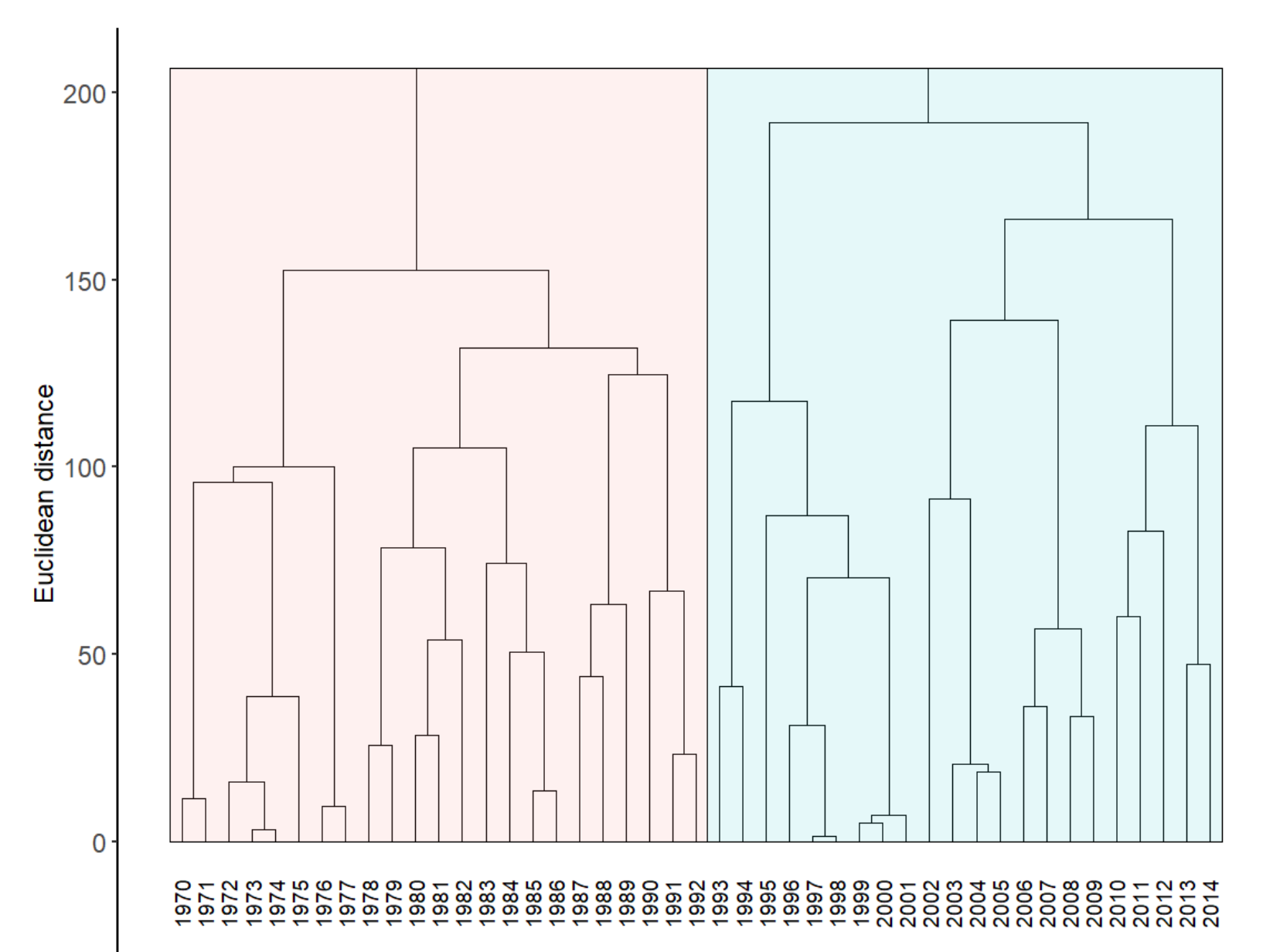


Fig. 1. Chronological clustering of TRW of Scots pine trees affected by wildfire in 1992 for the period (1970–2014).

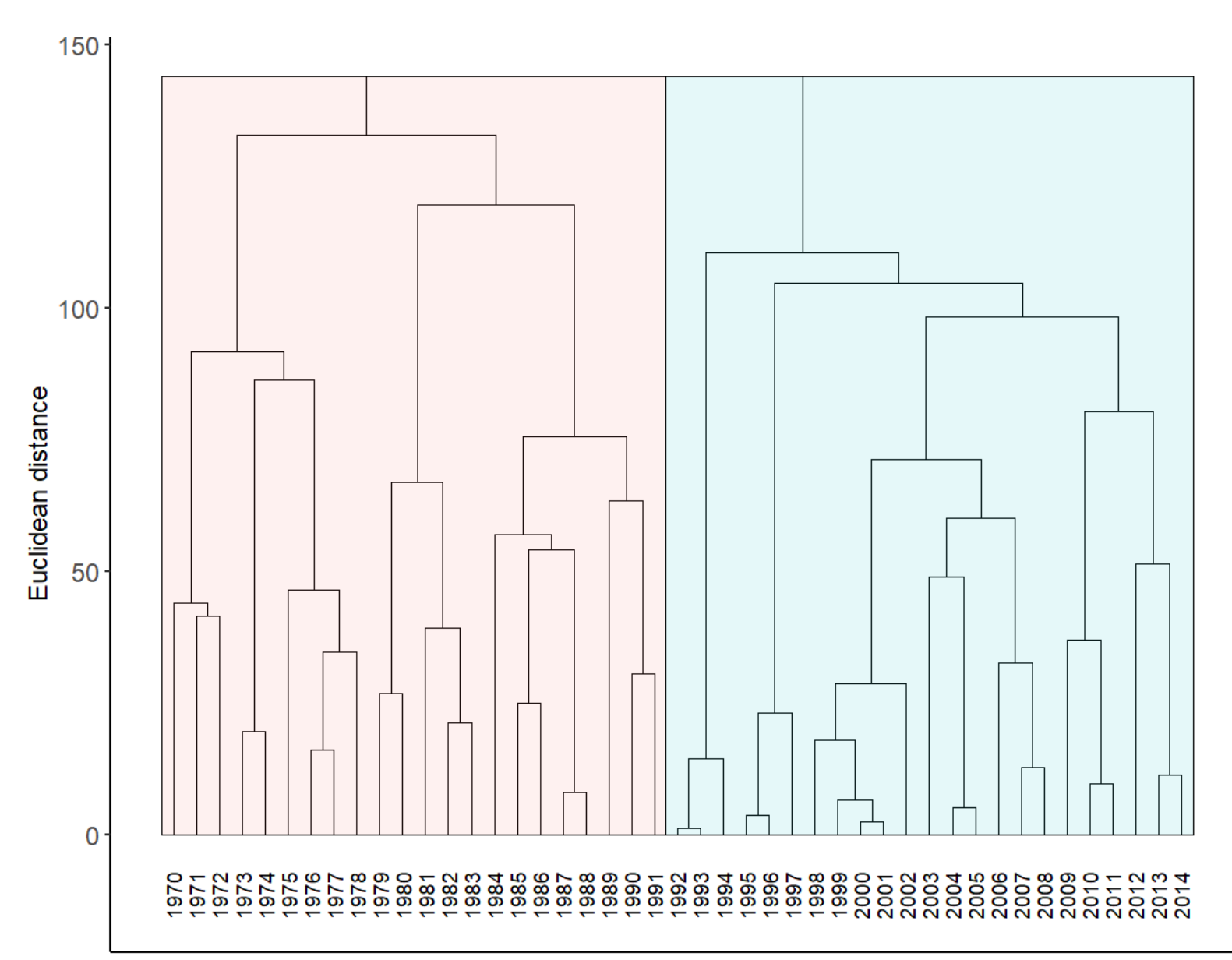


Fig. 2. Chronological clustering of TRW of Scots pine trees from control site for the period 1970–2014

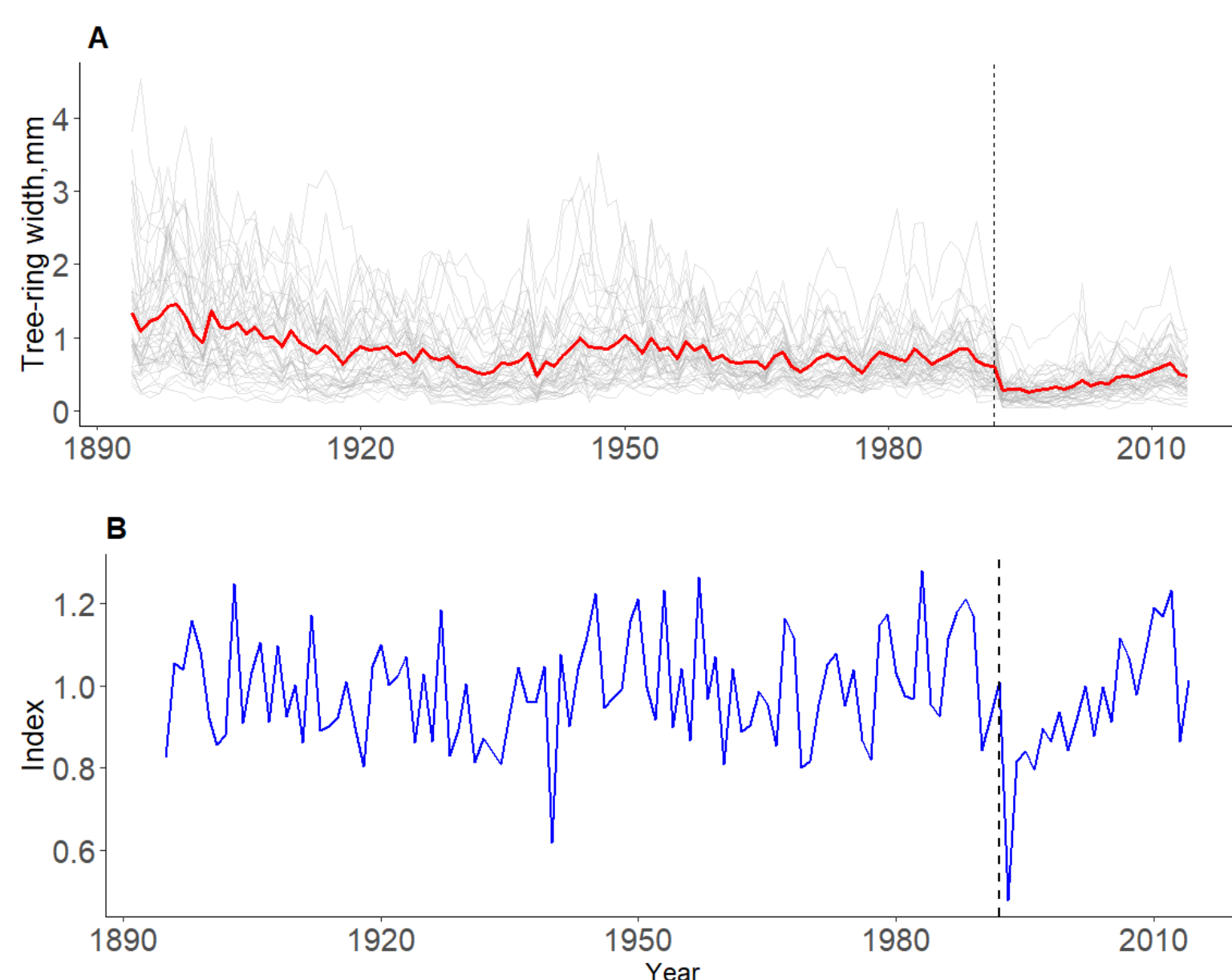


Fig. 3. (A) TRW series of Scots pine affected by wildfire in 1992 (red line—represents the mean time series) and (B) residual chronology of the cross-dated time series.

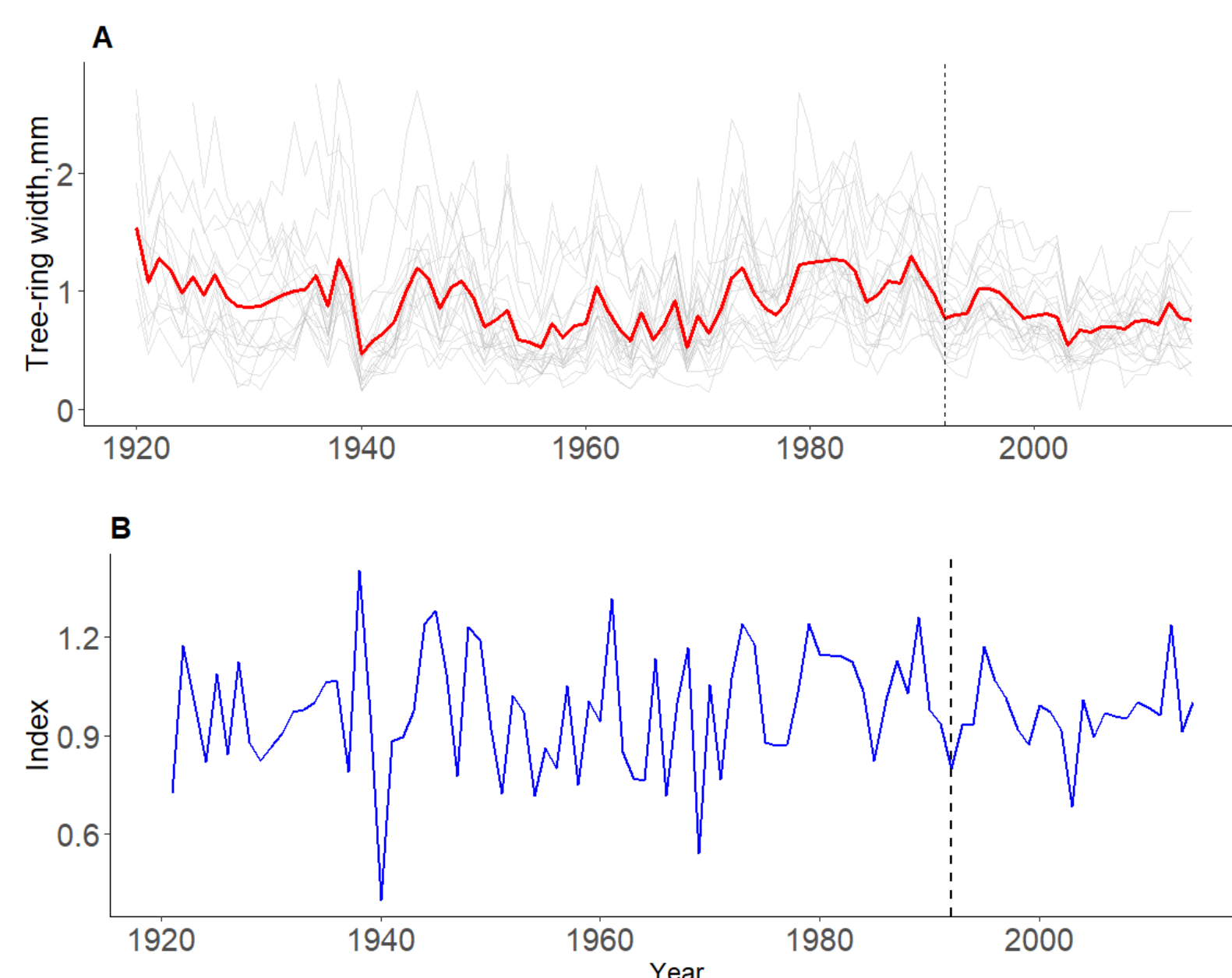


Fig. 4. (A) TRW series of Scots pine unburned—control area (red line—represents the mean time series) and (B) residual chronology of the cross-dated time series.

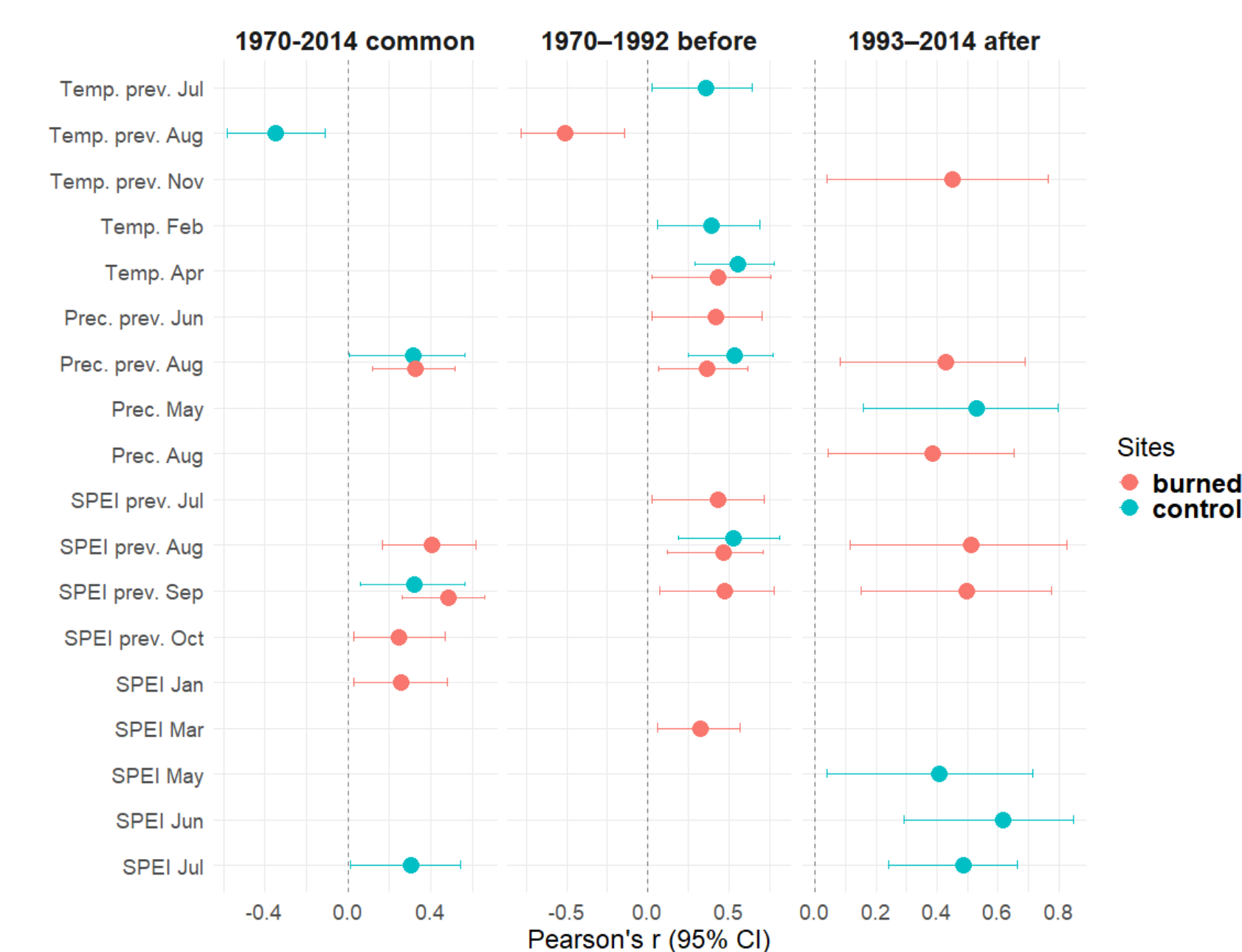


Fig. 5. Bootstrapped Pearson correlation coefficients between the residual chronology of TRW of Scots pine and meteorological variables for common period (1970–2014), before fire (1970–1992), and after the fire (1993–2014) periods. SPEI – standardized evapotranspiration indices; Prec – monthly mean precipitation; Temp – monthly mean temperature; prev – in previous

Table 1. The main effects of meteorological variables and their interaction (*) on the TRW chronology variation of Scots pine (Linear mixed-effects model)

	Sum of squares	F value	p value
Temperature in previous December	0.12509	7.131	0.02
Burned area	0.85404	48.6875	< 0.001
Precipitation in August	0.19274	10.988	0.002
Temperature in previous November	0.16891	9.6293	0.004
Temperature in previous December * burned area	0.12778	7.2842	0.01
Precipitation in August * burned area	0.35857	20.4415	< 0.001
Temperature in previous November * burned area	0.2642	15.0615	0.001
Precipitation in previous August * burned area	0.4452	12.69	< 0.001

Conclusions:

Wildfire had a significant influence on weather–growth relationships suggested by the linear mixed-effects model.

The most important weather factors were precipitation amount in August, precipitation amount in previous August and mean temperature previous in autumn (November) and winter (December).