

Declining oak forests – including tree mortality in vitality assessment

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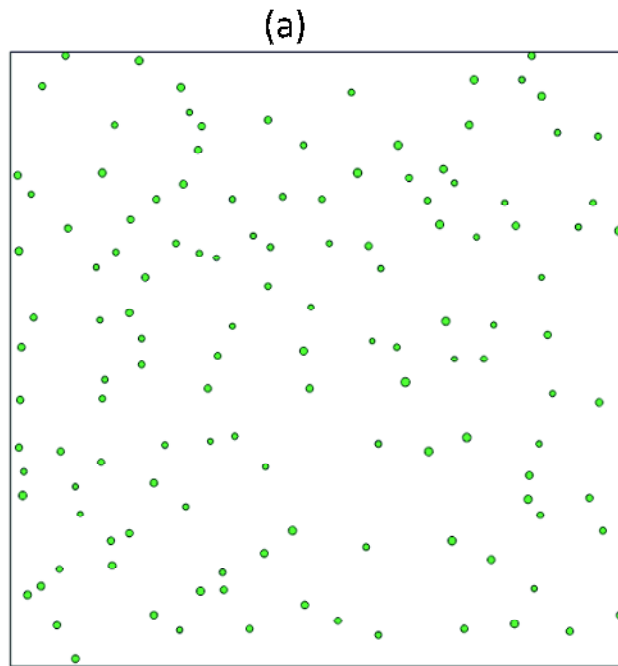
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Forest decline in Southern- and Eastern-Europe

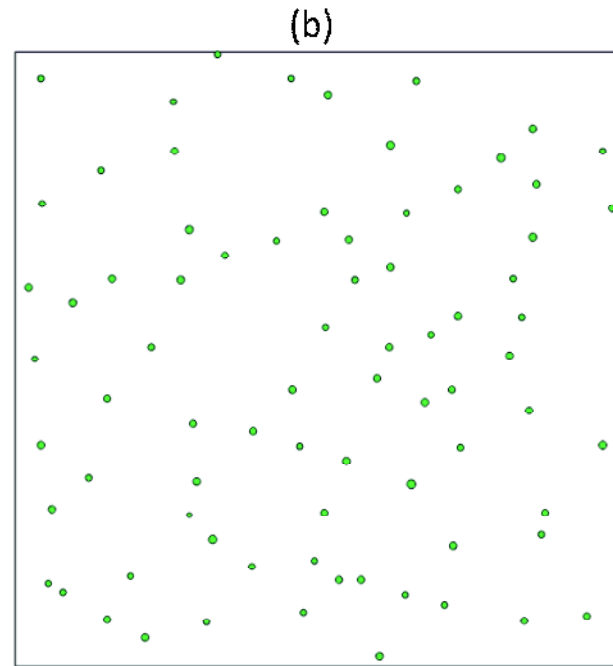
- Mass mortality of forest tree species has been observed in Southern and Eastern-Europe.
- The health condition of a stand is indicated not only by the crown condition (transparency) of the individuals, but the amount of former drought induced tree mortality.



Stand thinning due to dry periods



(a): Plot Nr. 6 in West-Hungary
(humid) actual tree number: 127



(b): Plot Nr. 12 in North-East-Hungary
(semiarid) actual tree number: 77

The spatial distribution of the tree individuals in two pure sessile oak quadrats with same average diameter.

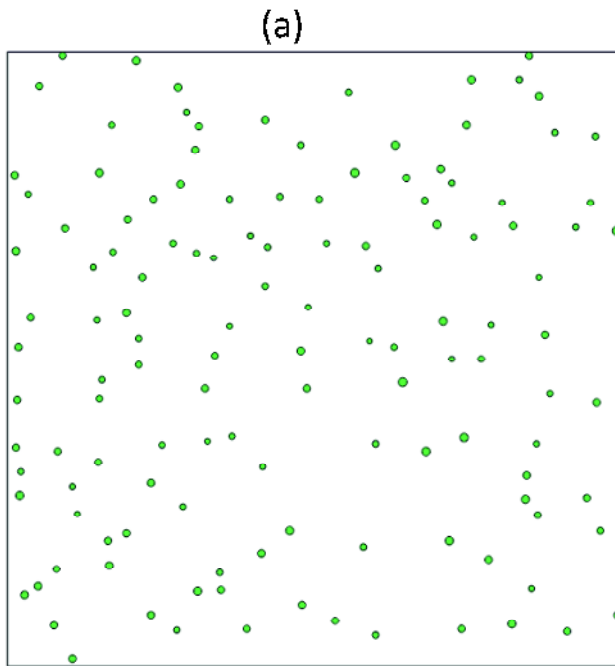
Density of stand „B” has been decreased as the consequence of dry periods.

1. Determining the **fully stocked density** (tree Nr./ha) of the stand depending from average diameter by Reinecke's rule

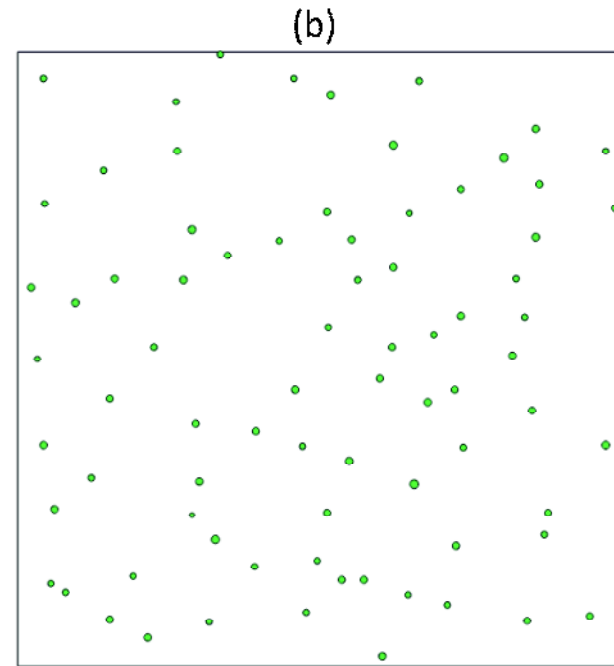
$$2. \quad \mathbf{D}_{relative} (\%) = \frac{\mathbf{D}_{actual}(\text{Nr./ha})}{\mathbf{D}_{fully}(\text{Nr./ha})}$$

$$3. \quad \mathbf{H}_{stand} (\%) = \frac{\mathbf{D}_{relative} \% \cdot \mathbf{H}_{crown} \%}{100}$$

Stand thinning due to dry periods



(a): in the humid West-Hungary,



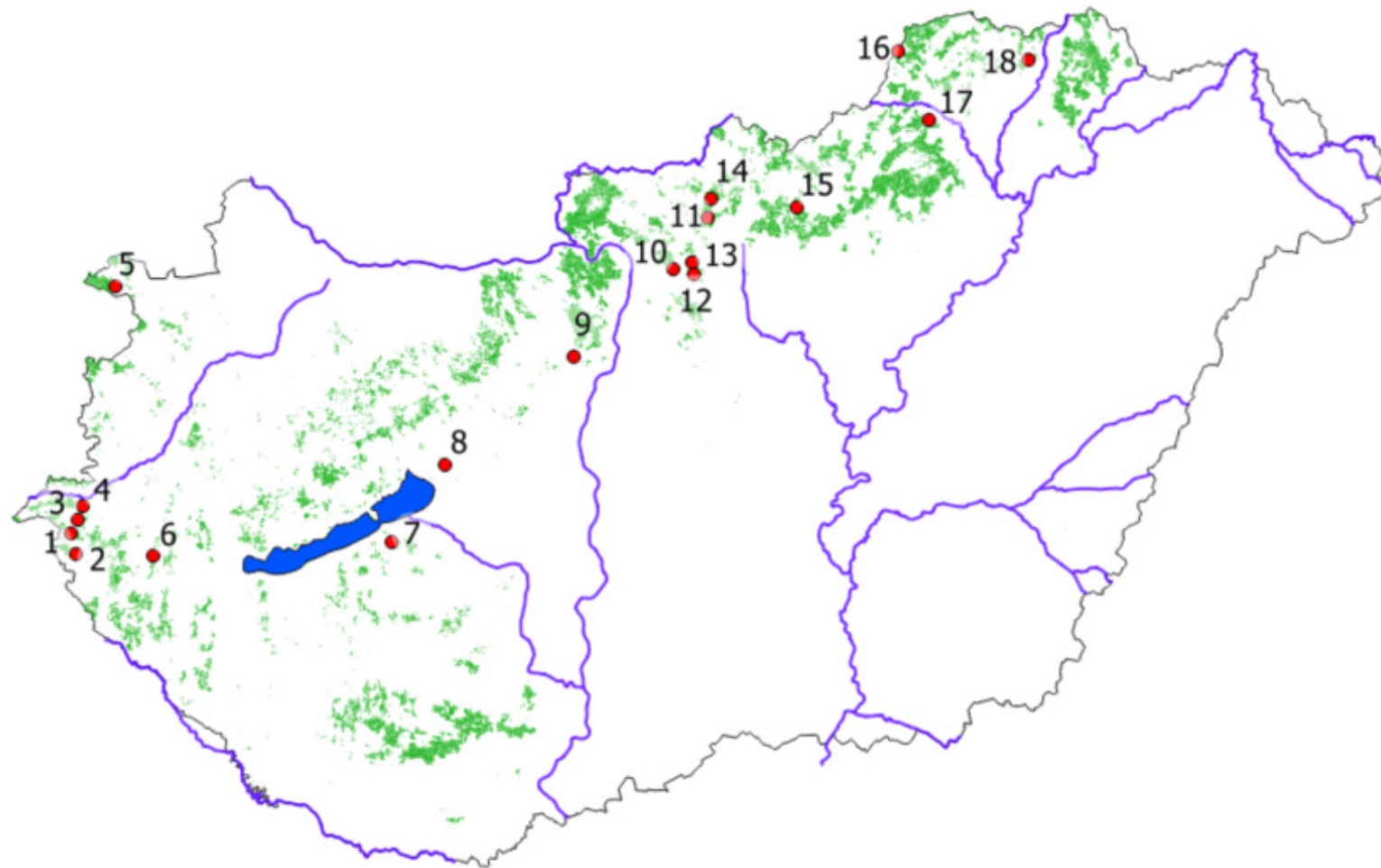
(b): in the semiarid North-East-Hungary.

Actual health status of the stand Nr. 6.

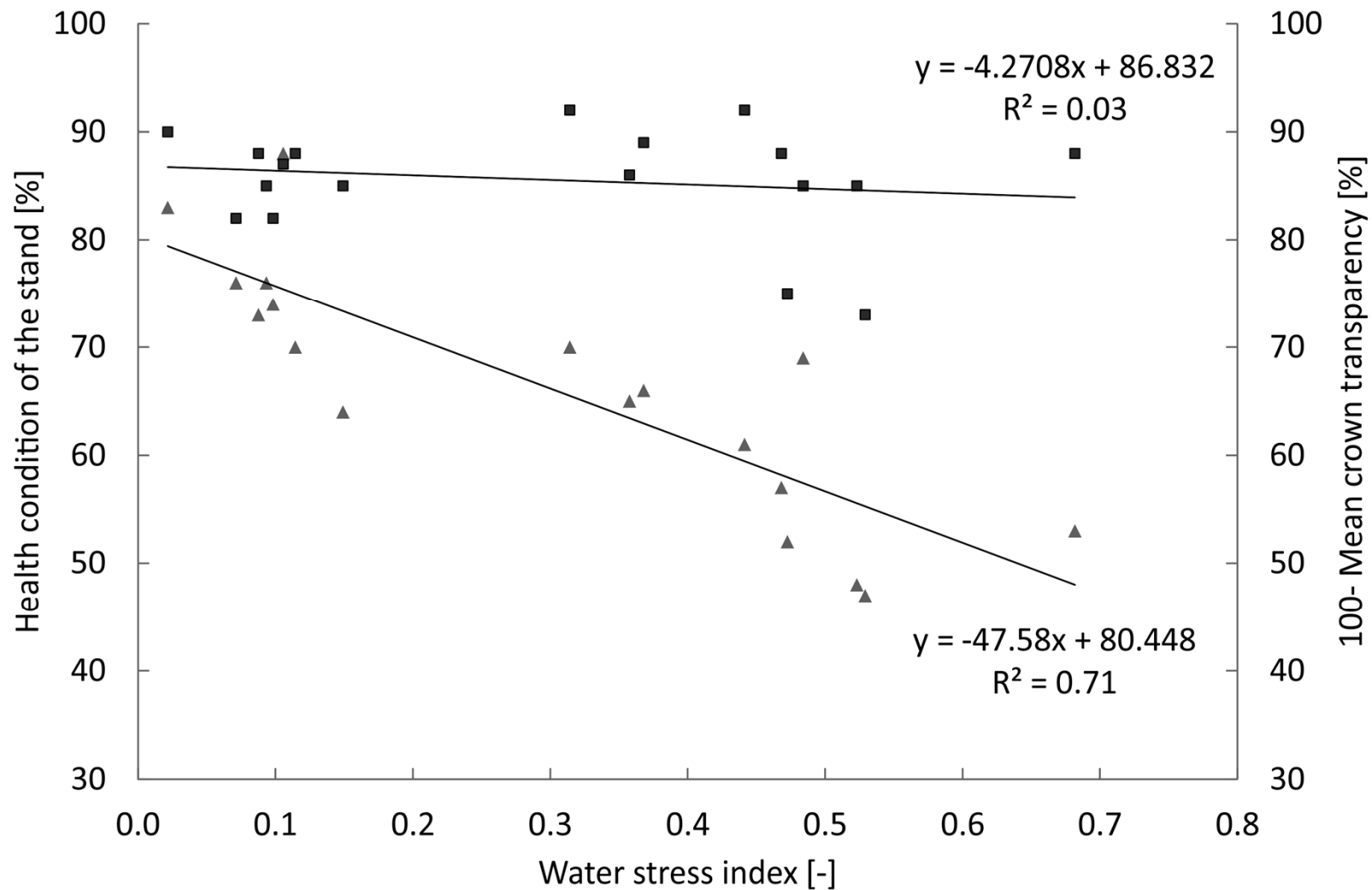
$$H_{\text{stand}} = \frac{98 \% \cdot 87 \%}{100} = 85\%$$

Actual health status of the stand Nr. 12.

$$H_{\text{stand}} = \frac{66 \% \cdot 81 \%}{100} = 53\%$$



Investigated sessile oak stands in Hungary



Relationship between the water stress index and the health condition (H_{stand}) of the stands (with triangles) and the mean crown transparency (H_{crown}) of the stands (with squares)

Thank You!

