



## How and why to establish mid-field refugia? Polish case study

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Polish hunting term "remiza śródpolna" means small mid-field islet being refugium habitat, covered usually by trees and shrubs, maintained and often designed for small wild game e.g. hares, pheasants, partridges. Apart from its biocenotic role, refugia can be crucial for improving water balance and protect local ponds against pollution. Hence, they should be considered as critical for design of sustainable agroforestry landscape. In Poland the refugia are often associated with mid-field trees and normally established under control of public Hunting Cooperatives and State Forest National Holding.

The refugia should be located in sunny places sheltered from the wind (south- and east-oriented lee slopes are considered the best in hilly areas) and if possible around small natural pond/stream in order to protect it or on unused/unsuitable for agriculture lands (field margins). The optimum size for the refugium is within the range 0.25-1 ha, most favorable of a square shape. Outer zone should include tall herbaceous vegetation and low widely spreading thorny bushes (blackberry, raspberry, rose), planted with spacing 0.3 x 1 m to protect inner zone and increase drought resistance. More internal part of the zone should be covered by tall bushes and trees e.g. hawthorn, Viburnum, mountain-ash, apple, spruce, juniper and pine (taller trees need to be planted on the east- and north-side of the place to reduce shade). Clumps of coniferous trees must be planted with spacing 2 x 2 m and pollarded regularly. The central zone of the dry islet should comprise at least  $\frac{1}{4}$  of the area, sown to grass or seasonal crop feeding wild game. In case of pond or stream, the distance of woody vegetation from the water zone must be at least of twice of its height. Once a refugium is established, planting hedges around is recommended. Protecting tree trunks, thinning, pruning and manual weeding are standard practices, being carried out depending on the need.



### Further reading:

Łowiec Publishing House. *Guidelines for planting, maintenance and observation of mid-field refuges* [in Polish]. [http://www.ozywicpola.pl/Instrukcja\\_internet.pdf](http://www.ozywicpola.pl/Instrukcja_internet.pdf) [access: 09/04/2019]

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