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DENDROLOGIC SPECIES IN STREET PLANTATIONS WITH SOUND-INSULATING ROLE

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Abstract

The study analyses the capacity of different dendrologic species to diminish noise and also considers optimum varieties of urban street plantations composition with the scope of noise reduction. Optimization restrictions will be analyzed – especially extreme restrictions – along with optimization factors which depend on the dendrologic species assortment and the quality of the architectural-landscape composition of the plantation; these aspects concord with some spatial decree restrictions which the landscape specialist must provide for when completing the sound-insulating street plantations.

Key words: *arbours, scrubs, sound-insulating, street plantation.*

INTRODUCTION

Street plantations are urban green spaces of general usage which accompany (border) the traffic arteries of the city; these plantations are subjected to pollution aggression and noxae generated by traffic. Phonic pollution is one of the aspects of urban environmental pollution, which leads to the necessity of studying optimization versions of noise reduction.

The capacity of alignment plantations to decrease sound depends on the dendrological species assortment, but also on their means of arrangement by composition manner and spatial-volumetric association of the species.

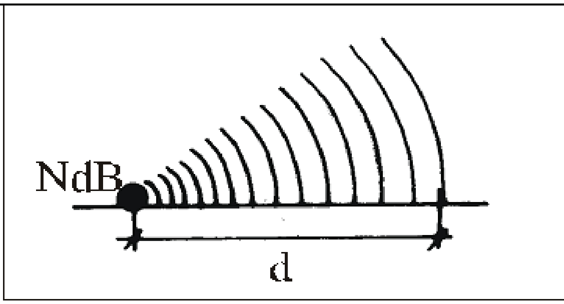
MATERIALS AND METHODS

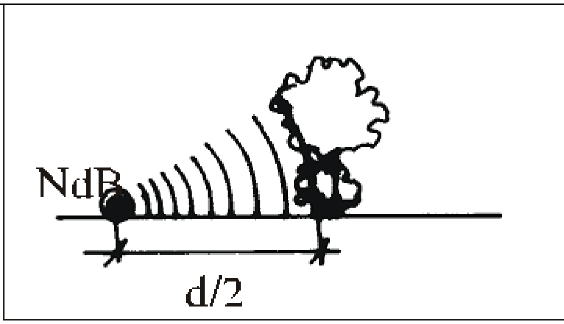
The optimization of street alignments compositions for noise reduction purposes is based on extreme conditions: dense and small leafage, dense ramifications and small intervals between leaf nodes.

Noise attenuation differs according to species: *Acer pseudoplatanus* reduces noise by 10-12 dB, *Tilia platyphilos* and *Viburnum lantana* reduce noise by 8-10 dB, while *Carpinus betulus*, *Quercus robur*, *Ilex aquifolium* and *Syringa vulgaris* reduce noise by 6-8 dB.

Considering that noise is reduced by propagation (at the distance d) with 5 dB in the absence of plantations, the same noise (with the value of N dB) will be reduced by 5 dB at half the distance (d/2) when plantations are encountered; in the case of an optimized plantation with dense leafage, the decrease in noise at the distance d/2 is even greater: NdB – 5dB – (10+6) dB (Figure 1).

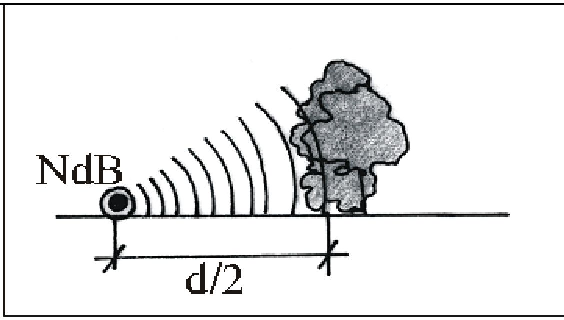
Distribution manner and spatial-volumetric association of species from street plantations may be accomplished by complex composition of alignments; the composition of complex alignments may include deciduous or rasineferous arbors and scrubs and hedges.

<table>
<tr><td>Version without plantation</td><td></td><td>At distance d, noise is reduced by 5 dB

NdB-5dBB</td></tr>
<tr><td>Un-optimized version – regular plantation</td><td></td><td>Noise is reduced at the distance d/2

NdB-5dB</td></tr>
<tr><td>Optimized version – plantation with dense leafage and large leafs

ACER PSEUDOPLATANUS

ILEX AQUIFOLIUM</td><td></td><td>Noise is reduced at the distance d/2 and also with the value of (10+6)dB

NdB-5dB-16dB</td></tr>
</table>

Figure 1. Optimized version of complex alignments

RESULTS AND DISCUSSIONS

Analyzing some solution versions (Figure 2, 3, 4) for some complex alignments, one can understand the aesthetic diversity given by rhythm elements (1-4 individuals which form the cadence of the rhythm), the alternation of deciduous species (as repeatability elements) with the rasineferous species (as rhythm elements), or the alternation of arbor species with scrub species (hedges or un-pared scrubs). The arrangement of these samples on several height registries (on foreground the short or medium vegetation and on background the tall vegetation) has as aesthetic role as well as an utilitarian one – noise and noxae reduction, achieving an optimal effect of encapsulation from noise, dust and noxae. Therefore, a qualitative-cumulative effects are obtained through the simultaneous presence of qualities and aesthetical effects, and also of those with protection roles against noise and various noxae.

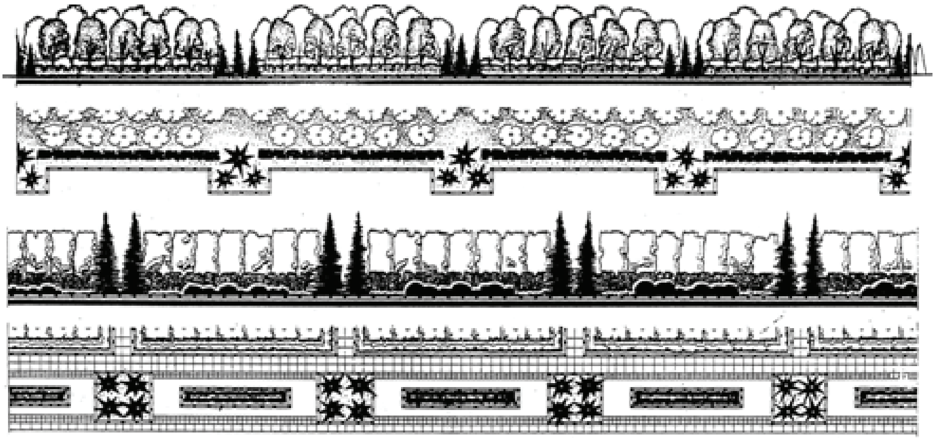


Figure 2. Version 1 of complex alignments

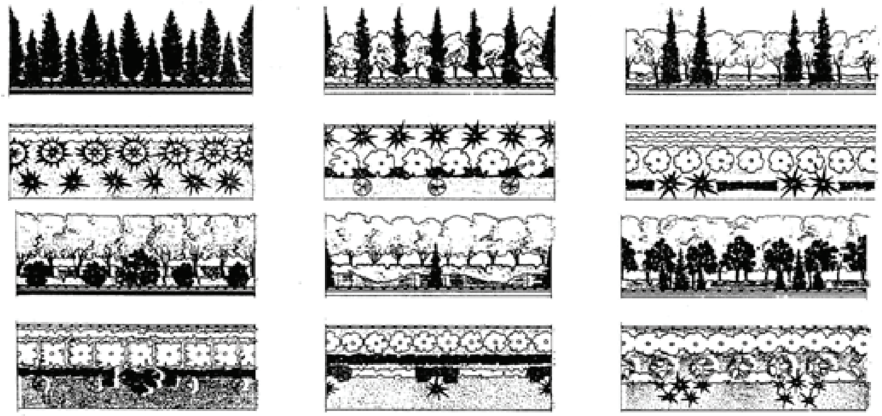


Figure 3. Version 2 of complex alignments

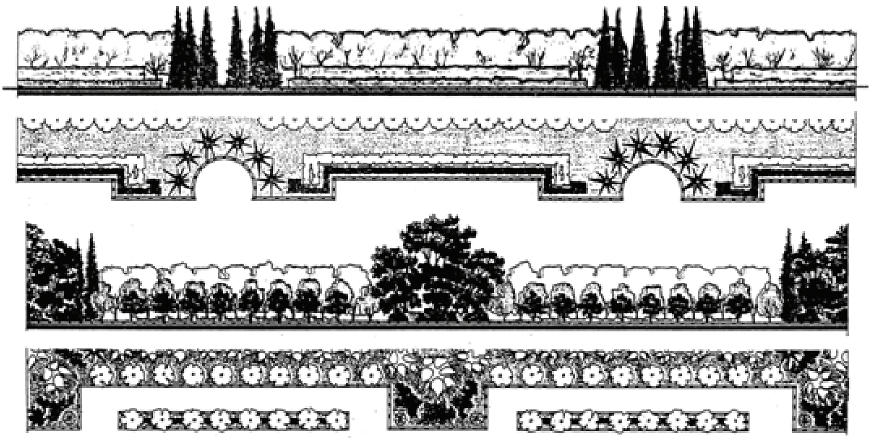


Figure 4. Version 3 of complex alignments

CONCLUSIONS

The optimized version (Figure 1) of completing complex alignments has a series of optimization restrictions: extremal conditions (dense leafage, small leafs, dense ramifications and small intervals between leaf nodes), spatial restrictions which refer to distances and available spaces for planting great numbers of arbors and scrubs, and alternative distribution of species.

In conclusion, optimization is achieved through quantity (large number of plants) and quality (adequate species according to the stated criteria).

In order to create optimum street alignments, the aesthetic aspect must also be taken account (Figure 2, 3, 4), which is realized through the combination of deciduous and rasineferous species of arbors and scrubs.

REFERENCES

ARCHIBUGI, F. 1997. The Ecological City and the City Effect. Ashgate Publishing Ltd., Aldershot, England, p. 63-65.

ILIESCU ANA-FELICIA, 2003. Arhitectură peisageră. Editura Ceres, București, p. 128-131.

STĂNESCU ANCA, 2011. Peisagistică urbană vol. II. Editura Printech, București, p. 91-103.

MISCELLANEOUS

EX·TERRA·AVRVM