

**ISSUES CONCERNING ANTHROPIC INFLUENCE
EXERTED ON STREET ALIGNMENTS IN IAȘI**

**ASPECTE PRIVIND INFLUENȚA ANTROPICĂ EXERCITATĂ ASUPRA
ALINIAMENTELOR STRADALE DIN MUNICIPIUL IAȘI**

*SANDU Tatiana¹, TROFIN Alina-Elena¹,
BERNARDIS R.¹, PANTAZI Viorica²*

e-mail: tatiana_sandu69@yahoo.com

Abstract. *Anthropic interventions made in Iasi street alignments in recent years, even by those who manage these green spaces, often raise questions about their intentions. By this analysis is intended to highlight certain aspects of inappropriate human actions impact on woody vegetation that provides decoration of areas vital for any city, for example the traffic arteries. Observations were made on a batch of 178 alignment trees on Carol boulevard and continuing on Ghica Voda alley from Iasi, during 2014 ÷ 2016, to establish their health status and decorating value, with the final aim to develop an overall long term program (on minimum 10 years) providing necessary interventions in the existing alignments, the distribution in time and space of these interventions, to avoid late or erroneous measures, as well as proposals for plantings.*

Key words: street alignments, anthropic influence, Iasi

Rezumat: *Intervențiile antropice aduse aliniamentelor stradale din municipiul Iași, în ultimii ani, chiar de către cei care administrează aceste spații verzi au pus, de multe ori, sub semnul întrebării intențiile lor. Prin această analiză se dorește evidențierea unor aspecte legate de impactul acțiunilor umane necorespunzătoare asupra vegetației lemnoase care asigură decorarea unor zone vitale pentru orice oraș, adică arterele de circulație. Observațiile au fost efectuate pe lotul de 178 de arbori de aliniament existent pe bulevardul Carol și în continuare pe Aleea Ghica Vodă, din municipiul Iași, în perioada 2014 - 2016, în vederea stabilirii stării de sănătate și de decorare a acestora, cu obiectivul final de a elabora un program de ansamblu pe termen lung (minim 10 ani) care să prevadă intervențiile necesare în aliniamentele existente, repartizarea în timp și spațiu a acestor intervenții, pentru a se evita măsurile tardive sau eronate, precum și propuneri de plantări.*

Cuvinte cheie: aliniamente stradale, influența antropică, Iași

INTRODUCTION

Urban green spaces can be considered among the most important elements of a city, having a positive impact on life quality and health of residents (Norman, 2006). It is therefore imperative that special attention be paid to interventions exerted on urban green spaces (Gerhardt, 2010). With the current paper we

¹University of Agricultural Science and Veterinary Medicine from Iasi, Romania

²S:C. Public Services S.A. Iasi, Romania

propose to study a serious problem linked to the quality of city green areas, namely the influence that humans have on them through their actions. The adverse effects on vegetation directly affect, whether we realize it or not, the welfare of the inhabitants of a city. The city of Iași has a total area of 660 hectares of green spaces according to the Romanian Statistical Yearbook of 2013, and these green spaces are divided as follows: 428 ha in the administration of Iasi City Hall; 127 ha in the care of Homeowners Associations and Tenants and 105 ha private property (Sandu *et al.*, 2003).

MATERIAL AND METHOD

The territory analysis of the green spaces with unlimited access from Iasi was carried out between 2014 - 2016 through the work of visual monitoring of the 178 alignment trees on the boulevard Carol I and further on Alley Ghica Voda in the district Copou in order to establish the state of their health, especially the anthropogenic interventions carried out on them.

Observations made on the tree specimens included in the study showed that they predominantly belong to two genres: *Tilia*, with 4 species: *Tilia cordata*, *Tilia platyphyllos*, *Tilia tomentosa* and *Tilia vulgaris*, and *Aesculus* with *Aesculus hippocastanum* sp.

Field measurements were performed using specific means (tape measure, compass, camera, 1 m measuring standard), monitoring the impact of logging on the trees canopy. To achieve the research results, there were carried out tests and measurements directly in the field, visual estimations of the state of vegetation and the condition of injuries resulting from anthropic interventions, image observations, being developed an overall program on long term providing necessary interventions in the studied alignment with the possibility of extending it on any other street alignments in Iași. This program aims to provide the necessary interventions in existing alignments, distributed in time and space, taking into account the objectives of landscape, the land nature and character of the road.

RESULTS AND DISCUSSIONS

Law no. 24 of 2007 (Legea 24/2007 privind reglementarea și administrarea spațiilor verzi din zonele urbane) stipulates that green spaces are public property maintained by the local government and other bodies empowered in this case, in compliance with legal regulations.

In the case of Iași, green spaces are public property administered by the Municipality of Iasi through Urban Management Bureau and SC Public Services Iasi SA.

The current law specifies a number of requirements for managers of green areas containing trees and shrubs, namely: they are obliged to perform maintenance; they are obliged to take measures to ensure the safety of people who might be affected by tearing or detachment of trees and / or elements of trees because their condition or because of age; if ornamentals elements are planted on green spaces within the public domain, the law prohibits interference by cuts in their crown, being allowed only works for the removal of dead branches or those

that endanger pedestrian traffic and road buildings in the area and network electricity in the immediate vicinity of the tree; administrators should monitor the health of plant vegetation in the green spaces under the direction and control of plant protection plant units; protection of green areas against pests and diseases is usually done through preventive methods, integrated methodologies and biological methods (applying substances on plants is usually prohibited or in extreme cases is allowed only with the consent and supervision of environmental institutions and phytosanitary accredited institutions) (Chiriac *et al.*, 2008).

We believe that this law leaves room for interpretation when issues such as cutting trees. Thus any tree next to a building, next to an electricity grid or right next to a path of pedestrian traffic can be cut or groomed more than necessary with the motivation that it might represent a danger.

Observations on the study area revealed that the works of grooming the trees in the area were performed excessively, remarking inclusively the cases of removal of trees "as prevention" without justifying exactly their extraction from the lineout. Thus, from a total of 179 trees taken under observation, our study showed that a total of 105 trees (58.9%) presented obviously incorrectly made grooming actions (cutting), only 29 specimens (16.3%) of them being obviously correct groomed and in a satisfactory state of health (fig. 2). Worth noting that 24 specimens (mostly lime) dried out in time or showed specific signs of biological decline.

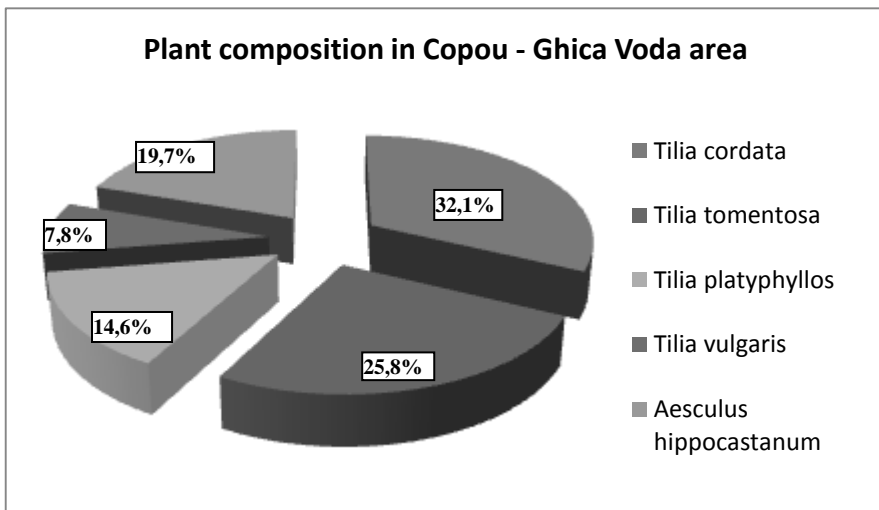


Fig. 1 The graph of plant composition in Copou-Ghica Vodă area

Analyzing chart 1 and table 1 shows that the alignment of trees belonging to Carol I boulevard (Copou) and Ghica Vodă alley is mainly formed by specimens of *Tilia cordata* and *Tilia tomentosa* (cca. 58%) followed by *Aesculus hippocastanum* (cca. 20%).

Thus, figure 2 shows that of the total 178 trees taken under observation was noted that 58.9% (105 trees) presented incorrect pruning cuts with multiple negative effects.

Our observations conducted between April 2014 - May 2016 allowed noting phytopathogenic attacks, especially fungal, on inadequate groomed trees. The most common attacks were those of the following species: *Auricularia auricula-iudae* (elder sponge), *Laetiporus sulphureus* (yellow tinder), *Fomes fomentariu* (tinder), *Stereum hirsutum* (oak tinder) and *Schizophyllum commune*. Fungal attacks were massive especially in the spring of 2015 due to lower temperatures in the spring and abundant rainfall on the background of inappropriate cuts on trees canopies (Lupu, 2014).

Table 1

The situation of alignment trees from Carol I boulevard (Copou) and Ghica Vodă alley- Iași

Species	No. specimens	%	Situation trees take remark				
			Correctly groomed	Incorrectly groomed	Correctly cut	Incorrectly cut	Need grooming
<i>Tilia cordata</i>	57	32.1	6	42	-	9	-
<i>Tilia tomentosa</i>	46	25.8	12	34	-	1	-
<i>Tilia platyphyllos</i>	26	14.6	8	16	-	-	2
<i>Tilia vulgaris</i>	14	7.8	3	8	-	-	3
<i>Aesculus hippocastanum</i>	35	19.7	-	5	3	6	21
Total	178	100	29	105	3	16	26

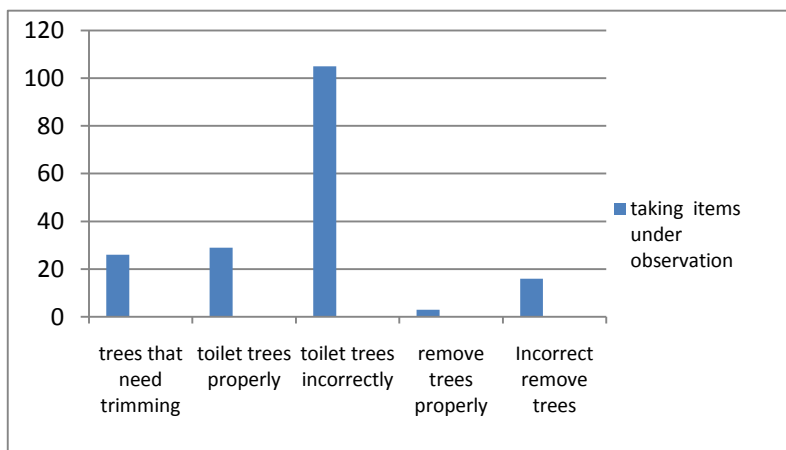


Fig. 2 The graph situation of anthropogenic actions on trees taken under observation

Thus our observations have revealed that a total of 48 specimens of lime, of the 143 analyzed showed remarkable xylophages fungi attacks.

Excessive cutting and fungal attacks favo-rable climatic conditions led practically to irreparable degradation of alignment trees within the researched area, most affected trees being specimens aged between 30 and 60 years, so trees that could still decorate the urban environment at least for 30 more years.

Our observations allowed the finding that in over 85% of our measurements, cut branches exceeding 10 cm in diameter are particularly vulnerable to mycotic attack due to the lack of protection and the large surface of the wound, leading shortly to the death of the branch and even the entire tree.

We believe that in terms of proper growth and monitoring, generalized interventions of annual cutting are not required in mature canopy street trees (Bradley, 2007). Typically, international practice in this area requires such proactive maintenance of trees every four years (the four-yearly cycle). Interventions should be performed casuistically, depending on the context and characteristics of each specimen and should not exceed more than 1/3 of its canopy (Norman, 2006). Also, international regulations recommend that all cuts be made by formally qualified foresters, with sharp tools (including moto saws) (Gerhardt, 2010), the cutting being disinfected with technical alcohol (or a bleach and water solution 1:10), and the resulting cuts should be distempered with Bordeaux mixture or a substitute and then painted with an alkyd paint (especially if plantations are vulnerable to xylophages fungi attack). Our proposal of *Appropriate management program of street alignments* requires careful observation of the development of specimens, so before any cutting is performed to conduct also a diagnosis of each specimen's phytosanitary health. Thus, this Program states that:

- recommend to cut branches above a future branch;
- inside the crown will remove branches with vertical insertion that may lead to branching, too dense branches that prevent light from entering the inside of the crown and branches deprived of light that naturally defoliate;
- it is not recommended to cut structure branches;
- „greedy” branches appearing due to severe cuts will not be systematically suppressed because they lead to other greedy branches, resulting in the premature depletion of the tree (recommended progressive elimination);
- cuts must meet the following technical rules: cut branches must be located above the insertion of a sap attractive branch; the volume extracted by grooming branches from the crown should not exceed 20-30% of the volume of the crown; the cutting angle of the branches must allow rapid and good cut surface healing.
- trees may be subjected to recovery cuts only if they have a good vigor, allowing the emergence of sufficient and properly disposed new stems, of which we will select future skeleton branches that will be regularly monitored in the coming years in terms of vigor, orientation, growth and branching.

➤ optimal time for implementing mature alignments trees' cutts is recommended during dormant stage, except during periods of falling leaves and frosty periods.

➤ forming scar tissue on resulted wounds require 4 to 5 months, the healing capacity being maximum during the vegetation period.

➤ instruments used in cutting are required to be disinfected with alcohol and cuts protected by coating with alkyd resin-based paint.

To ensure consistency of interventions and a gradual exploitation in time and space of street alignment, we recommend the use, for each alignment in part, of a management guide and a schedule of works.

CONCLUSIONS

1. The observations realized in the studied area (Carol I boulevard - Copou and Ghica Vodă Alley) during 2014-2016, showed that pruning work carried out since the spring of 2013 were inappropriate and excessively made.

2. Of the 178 analyzed trees, 105 (58.9%) showed effects of improper pruning, a total of 24 trees (mostly lime) drying or being currently in an obvious biological decline.

3. Cuts made improperly allowed the installation of wood decay fungi, noting that in 2015, 48 specimens belonging to the genus *Tilia* were found presenting obvious fungal attacks.

4. Measurement of the cut branches (stubs) revealed the conclusion that in over 85% of the cases, branches with a diameter greater than 10 cm were inadequately protected and were obviously vulnerable to xylophages fungi.

5. Annu clipping of alignment trees branches conducted without compliance to hygiene rules is an unjustified practice and particularly harmful to the trees health.

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