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Assessment of drought resistance in plants of the genus *Aristolochia* L.

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Abstract. The examination of plant resistance to drought is becoming increasingly relevant due to global warming. All species of the genus *Aristolochia* L. possess high decorative qualities and play an important role in natural ecosystems. However, under conditions of temperature imbalance, their ornamental value may decrease due to leaf turgor loss and even leaf shedding. The purpose of the paper is to highlight the results of studies on the drought resistance assessment of *Aristolochia* L. plant species to identify the most promising taxa suitable for cultivation in the city of Kyiv. The study was conducted in 2022 on three species of vines: *Aristolochia macrophylla* Lam., *A. tomentosa* Sims., *A. manshuriensis* Kom., which grow in the M.M. Gryshko National Botanical Garden (Kyiv). The study presented results on leaf hydration parameters, water deficit, water-holding capacity of leaves, electrical conductivity, and specific leaf area conducted in the Plant Physiology and Microbiology Laboratory of the Institute of Horticulture, National Academy of Agrarian Sciences

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of Ukraine. Field assessment of *Aristolochia* L. plant drought resistance was also conducted. It was established that *Aristolochia macrophylla* Lam. is the most drought-resistant species, exhibiting low transpiration rates and high water-holding capacity. *Aristolochia tomentosa* Sims. it is the least drought-resistant species, which therefore needs additional care. In field conditions, significant signs of wilting were not observed, indicating that leaves reduce turgor during the day and recover at night. It is also important to preserve the environment in which these plants grow, as its changes affect the drought tolerance and life cycle of lianas. The results of the drought resistance research on *Aristolochia* L. plants point to the potential of these species. They can be used for selecting plant assortments for creating various types of plantations in urban environments

Keywords: water retention capacity; water deficiency; water content; lianas, electrical conductivity

Introduction

Insufficient moisture and the influence of high temperatures on plants during the summer period often have a negative impact on the state of decorative qualities, the appearance of foliage, flowers, and fruits. Vines can be beneficial for greening in drought conditions as they usually have deep roots and the ability to store water in their stems and leaves. Analysis of the impact of drought on vines is necessary for several reasons: climate change, the importance of lianas for ecosystems, industrial and medicinal uses, and biodiversity conservation.

Due to global climate change and the consequences of war, the state of Ukrainian lands is deteriorating, which pushes its ecosystems almost to the verge of destruction. According to UN forecasts, by 2050, drought could affect more than three-quarters of the world's population (Espinosa, n.d.). According to an all-Ukrainian sociological survey by O. Mar'iuk *et al.* (2021), it was mentioned that since 2000, the number and duration of droughts have increased by 29% compared to previous decades. Forest restoration is the largest natural climate solution that could potentially reverse the biodiversity crisis, especially in tropical countries. H.P. Griscorn (2020) claimed that almost half of all inventoried trees in dry tropical forests (44%) have at least one vine crawling on them, with

the most common species being *Bauhinia glabra* Jacq. and *Macherium microfolium*.

From the study of S.G. Boychenko & O.G. Zabarna (2019), it can be seen that in recent years, there has been a trend towards increasing average monthly temperatures in the summer in Kyiv. A large number of plantations, especially urban ones, are in areas with limited water supply. In such conditions, the water-holding capacity of leaf tissues and the ability to repair physiological processes after the effects of drought are particularly important, and similar studies in Ukraine were conducted fifteen or more years ago (Kyryliuk 2005).

A.I. Kolesnikov (2018) concluded that species of the genus *Aristolochia* L. are perennial herbaceous plants with smooth upright or twining stems or woody lianas. They are distributed in tropical, and less frequently, temperate zones. The root system consists of short creeping rhizomes. Their size can be larger than that of trees, which has a positive impact on the plant condition during drought. However, as with any plant, prolonged and severe drought can have a negative effect on this plant genus. In particular, *Aristolochia* L. can react to drought by reducing the size and colour of its foliage. In addition, these plants can temporarily reduce the growth rate of new shoots and leaves. Spe-

cies of the genus *Aristolochia* L. can store water in their roots and stems and use it when needed. Research on *Aristolochia bracteolata* Lam. revealed its ability to survive even in hot dry summer conditions. With moderate to severe water scarcity, the moisture content does not significantly decrease. P. Madhuri *et al.* (2021) established that increased tannin content during drought in plants indicates an oxidative role and protection of tannins in dry conditions. Warming can also affect the interaction of plants with other trophic levels, including herbivores. M. Gonzalez-Teuber *et al.* (2023) found that warming did not considerably affect the productivity of the species *Aristolochia chilensis* Bridges ex Lindl., but it led to changes in leaf nutrient content. Larvae that fed on heat-treated plants demonstrated enhanced growth and efficient food conversion. Furthermore, as asserted by S. Nath *et al.* (2022), some *Aristolochia* L. species are economically important due to the presence of secondary metabolites and wide usage in traditional and modern medicine. Consequently, most recent studies focused on genetic and biotechnological aspects, with little emphasis on the ecological features of these lianas.

The purpose of this study is to evaluate the drought resistance of *Aristolochia* L. plants using laboratory and field methods, with the intention of recommending their use for greening in Kyiv. The research objectives included determining the physical and biochemical parameters of plants under hydrothermal stress conditions, which form the basis for identifying functionally related characteristic complexes with the action of protective mechanisms and exploring the water regime as part of the overall metabolic exchange process to assess the state of introduced species in the urban conditions of Kyiv. Based on the obtained data, the study aimed to recommend the most promising plants capable of adapting to stressful

situations created by climatic conditions during the vegetation period.

Materials and Methods

For the study, plants of the genus *Aristolochia* L. were selected (*Aristolochia macrophylla* Lam. – native to North America, *Aristolochia manshuriensis* Kom. – native to Northeast China and Korea, *Aristolochia tomentosa* Sims. – native to North America).

The physiological characteristics of *Aristolochia* L. plants were investigated in the Plant Physiology and Microbiology Laboratory of the Institute of Horticulture, National Academy of Agrarian Sciences of Ukraine. The experiments were conducted in July 2022. Samples were taken early in the morning, placed in sealed bags, and delivered to the laboratory. Three samples were taken for each plant species for the experiment. During the study, the Convention on Biological Diversity (1992) standards were observed.

To identify drought-resistant varieties, the water-holding capacity of leaves, their water deficit, ability to regain turgor, and tissue hydration were determined (Eremin & Gasanova, 1999).

For the determination of the total water content, 5–10 leaves of each variety were placed in metal boxes (with double repetition) and dried in a thermostat at a temperature of 105°C until a stable mass was achieved.

The total amount of water (B) as a percentage of the raw weight of the suspension is determined by the formula:

$$B = \frac{B-c}{B-a} \times 100\%, \quad (1)$$

where a is the mass of the empty box (g); b is the mass of the box with the fresh weight (g); c is the mass of the box with the dry weight (g).

Water deficit (WD) was studied over time (at 2, 4, 6, and 24 hours). To determine water deficit, leaves (3 each from every species) were

weighed and placed in a flask with water for saturation. The flasks were placed in a crystalliser with water and covered with a similar crystalliser to create an air chamber. After 24 hours of saturation, the leaves were blotted with filter paper and weighed.

The water deficit in the leaves (as a percentage of the total water content in a fully saturated state) was calculated using the formula:

$$B = \frac{M_2 - M_1}{M_3 - M} \times 100\%, \quad (2)$$

where M is the mass of dry weight; M1 is the mass of water before saturation; M2 is the mass of water after complete saturation; M3 is the mass of leaves after full saturation with water.

The drought resistance, particularly water-holding capacity during wilting, was determined over specific time intervals (2, 4, 8, 24 hours). To assess moisture deficit, samples were immersed in room-temperature water for 30 minutes, then blotted with paper towels to remove surface water. The calculation of moisture deficit was performed as a percentage of the mass of water-saturated leaves. In field conditions, the drought resistance of *Aristolochia L.* plants was determined using the S. Piatnytskyi scale (1961). This scale allows the assessment of plant drought resistance on a scale from 0 to 5 based on external signs of their condition: 0 points – the plant dies from drought; 1 point – leaves fall off, tips of shoots dry out; 2 points – more than half of the leaves and some shoots dry out; 3 points – less than half of the leaves are affected; 4 points – leaves lose turgor during the day but regain it overnight; 5 points – the plant is not affected by drought.

Specific leaf surface density (*SLSD*) is a morphological characteristic that significantly influences plant productivity (Sedov & Ogoltsova, 1999). It is measured in g/cm^2 and calculated using the formula:

$$SLSD = LM/LA, \quad (3)$$

where *LM* is the leaf mass and *LA* is the leaf area.

For the determination of electrical conductivity, the E 7-13 conductivity meter (manufacturer – radio measuring equipment factory, Zolochiv, Ukraine) was used with needle-like molybdenum electrodes and a distance of 9 mm between them, following the method of V.V. Torop *et al.* (2002). This device operates by measuring the resistance of the electrolyte in the solution, which is proportional to its electrical conductivity.

Results and Discussion

An important element of assessing the physiological state of plants during water deficit is their ability to maintain an optimal level of leaf tissue hydration. Determining the water-holding capacity of *Aristolochia L.* plants allows for establishing their capacity to retain water after wilting. This feature provides high drought resistance (Krivoshapka *et al.*, 2012). In Table 1, it can be observed that when investigating the total moisture content under laboratory conditions, the level of leaf hydration of the investigated *Aristolochia L.* species ranged from 69.1% (*Aristolochia macrophylla* Lam.) to 72.8% (*Aristolochia manshuriensis* Kom.).

Table 1. Water content of leaves of plants of the genus *Aristolochia L.*, %

Species name	Water content, %			
	Sample No.1	Sample No.2	Sample No.3	Average value
<i>Aristolochia macrophylla</i> Lam.	73.9	66.7	66.7	69.1
<i>Aristolochia tomentosa</i> Sims.	69.3	69.7	70.5	69.8
<i>Aristolochia manshuriensis</i> Kom.	74.2	71.8	72.4	72.8

Source: compiled by the authors

Leaf water deficiency shows the stability of water homeostasis during drought. It depends on various factors, such as climatic conditions, seasonal changes, and the environment in which the liana grows. Many *Aristolochia* L. lianas have the ability to survive in

water deficit conditions. They can possess large and deep root systems, allowing them to extract moisture from deeper soil layers. The average values of the studied species, according to Table 2, did not exceed 13.99%, indicating high drought resistance of the plants.

Table 2. Water deficiency of plant leaves of *Aristolochia* L., %

Species name	Water deficiency, %			
	Sample No.1	Sample No.2	Sample No.3	Average value
<i>Aristolochia macrophylla</i> Lam.	12.37	12.19	11.11	11.89
<i>Aristolochia tomentosa</i> Sims.	12.97	13.23	15.77	13.99
<i>Aristolochia manshuriensis</i> Kom.	13.10	12.00	11.94	12.35

Source: compiled by the authors

The lowest water deficit was found in *Aristolochia macrophylla* Lam. – 11.89%, and the highest in *Aristolochia tomentosa* Sims. – 13.99%. Moreover, a high water deficit value was observed in *Aristolochia manshuriensis* Kom. – 12.35%. This indicates a lower adaptive potential for drought. Leaf water holding capacity reflects their ability to retain water during drought and can indicate the behavior of plants in extreme conditions.

Some *Aristolochia* L. liana species are specially adapted to collect and retain water. Their leaves can have a fairly large surface that collects dew and precipitation. In addition, some species of *Aristolochia* L. have a robust and

spongy leaf structure, which enables them to retain moisture and enhance water holding capacity. Overall, *Aristolochia* L. lianas have the ability to retain a certain amount of moisture, although their exact capacity to do so may vary depending on the species and the environment in which they grow. Studies on water retention capacity during drying revealed that in the first 2 to 4 hours, the leaves of *Aristolochia* L. lianas lost the most water.

The highest water retention capacity was found in *Aristolochia macrophylla* Lam. After 24 hours of air drought, the remaining water content was 72.6%, as can be seen in Figure 1.

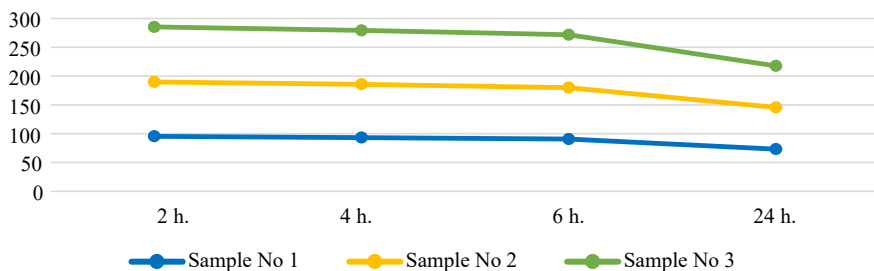


Figure 1. Water retention capacity of the leaves of *Aristolochia macrophylla* Lam

Source: compiled by the author

In the first 2 hours, the remaining water content in the leaves of *Aristolochia macrophylla* Lam. was 95.12%. After 4 hours of water loss, the remaining content was 93.1%, and after 6 hours, it was 90.6%. This indicates that this species is drought-resistant and capable of withstanding dry climatic conditions.

The liana *Aristolochia tomentosa* Sims. possesses large leaves covered with dense hairs. The presence of such dense hairs suggests that

they might have adaptations for water conservation. These hairs could also help reduce water loss by creating a barrier that slows down evaporation from the leaf surface and retains moisture nearby. However, our research showed that within the first 2 hours, the remaining water content in *Aristolochia tomentosa* Sims. was 90.08%. Figure 2 illustrates that the critical measure of water loss is the value after 24 hours of dryness exposure.

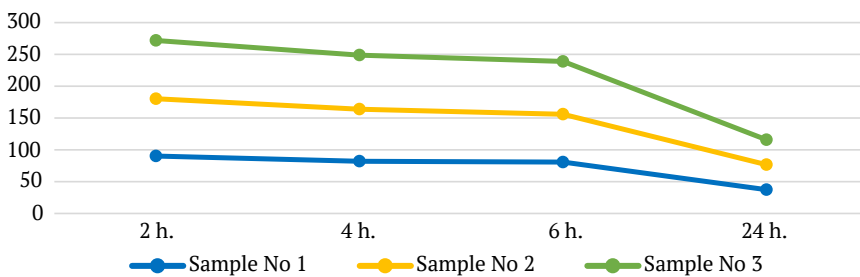


Figure 2. Water retention capacity of the leaves of *Aristolochia tomentosa* Sims

Source: compiled by the author

Therefore, *Aristolochia tomentosa* Sims. has a water retention capacity of 37.36% after 24 hours of air-dry exposure, indicating its lower drought resistance compared to other species. The least water loss in the first 2 hours was

observed in *Aristolochia manshuriensis* Kom. – the remaining content was 95.8%. The remaining water content after 24 hours of exposure in *Aristolochia manshuriensis* Kom. was 62.22%, indicating better drought resistance (Fig. 3).

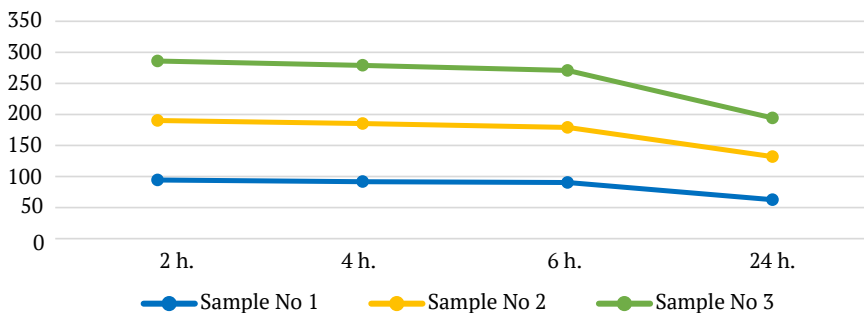


Figure 3. Water retention capacity of the leaves of *Aristolochia manshuriensis* Kom.

Source: compiled by the author

After 24 hours of air-dry exposure, as depicted in Figure 4, it is visually evident that *Aristolochia macrophylla* Lam. possesses the highest water retention capacity, which is also confirmed by laboratory measurements. The

leaves of *Aristolochia tomentosa* Sims. experienced the most significant negative impact from dryness, indicating lower drought resistance compared to *Aristolochia manshuriensis* Kom. and *Aristolochia macrophylla* Lam.

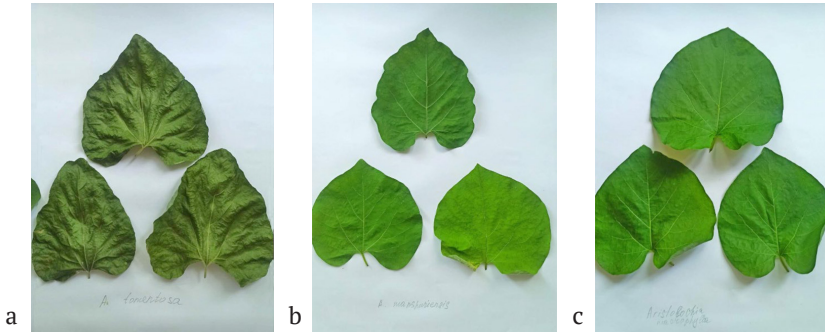


Figure 4. The leaves of *Aristolochia* L. after 24 hours of air drought

Note: a – *Aristolochia tomentosa* Sims., b – *Aristolochia manshuriensis* Kom., c – *Aristolochia macrophylla* Lam

Source: photographed by the authors

The electrical conductivity of plant leaves is closely related to their drought resistance. This process in plants can occur due to the presence of ions that can be transported through plant tissues. Furthermore, the reduced water content in leaves can decrease electrical conductivity since water is a good conductor of electricity. Therefore, plants with high ion content and

low leaf moisture may be more drought-tolerant. Upon completing the investigation to assess the leaf electrical conductivity levels in *Aristolochia* L. plants over a 24-hour period, it is evident from Figure 5 that there is an inverse relationship between water depletion and electrical conductivity. As the plant expends more water, the electrical conductivity decreases.

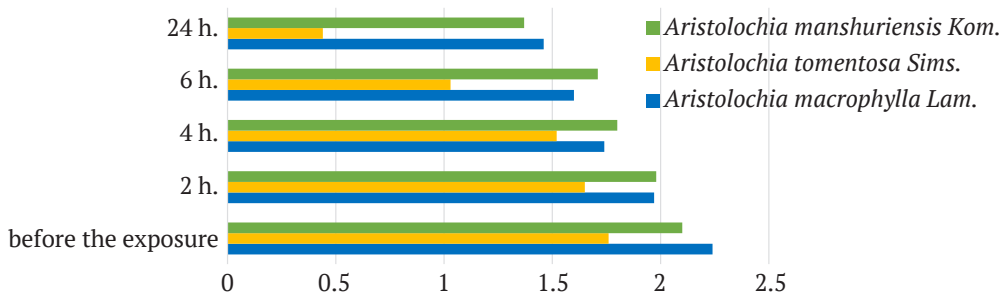


Figure 5. Electrical conductivity level of plant leaves of *Aristolochia* L., mS

Source: compiled by the author

Plant leaves typically consist of various tissues and cells that contain fluids, which can contain certain amounts of electrolytes. However,

leaf electrical conductivity often tends to be lower compared to other plant parts like stems or roots. According to the measurement results,

Aristolochia macrophylla Lam. exhibits the highest level of electrical conductivity among *Aristolochia* L. liana species, indicating its greater drought resistance.

V.V. Makovskyi & N.H. Vakhnovska, (2019) conducted experimental studies on drought resistance in liana species from the *Ampelopsis* Michx. and *Parthenocissus* Planch. genera. They concluded that the higher drought resistance of *Ampelopsis* Michx. species is due to more pronounced xeromorphic features in leaf surface anatomy, higher water retention capacity, and lower leaf water deficit levels, all of which contribute to a higher degree of adaptive potential. A gradual decrease in the electrolytic conduc-

tivity of leaves during their wilting indicates a high resistance of the studied introducers to atmospheric drought. This theory is supported by studies on *Aristolochia* L. liana species.

Plants with a more active photosynthetic apparatus tend to accumulate more dry matter per unit leaf area under optimal conditions. Lianas usually grow in dry or hot environments, so they can have leaves with a high surface density, which helps reduce moisture evaporation through the leaf plate. This may be due to the waxy coating of the leaves, a large number of hairs, or the presence of stomata (pores on the leaves) that regulate gas exchange and evaporation (Table 3).

Table 3. Specific leaf surface density of *Aristolochia* L. plants, g/cm²

Species name	SLSD, g/cm ²			
	Sample No.1	Sample No.2	Sample No.3	Average value
<i>Aristolochia macrophylla</i> Lam.	1.84	8.59	5.87	5.43
<i>Aristolochia tomentosa</i> Sims.	3.72	2.77	2.35	2.95
<i>Aristolochia manshuriensis</i> Kom.	3.30	5.49	3.57	4.12

Source: compiled by the authors

Research results indicate that *Aristolochia macrophylla* Lam. exhibits the highest SLSD values (5.43 g/cm²), while *Aristolochia tomentosa* Sims. has the lowest (2.95 g/cm²). Furthermore, *Aristolochia manshuriensis* Kom. shows a high SLSD value (4.12 g/cm²). It affects the effectiveness of transpiration. Leaves with high density tend to have reduced evaporation surface area, aiding the plant in water conservation and adaptation to water-limited conditions.

Conversely, the low SLSD of *Aristolochia tomentosa* Sims. leaves suggests that they might evaporate more water through their surface. This can be a problem in arid and hot climates when the plant can quickly lose moisture. High SLSD in *Aristolochia macrophylla* Lam. indicates a greater number of cells and tissues per unit area, potentially an adaptation to optimise photosynthetic surface. Such leaves reduce

evaporation through their surface and preserve resources.

A.A. Wright *et al.* (2014) found that lianas are vital components of tropical forests, accounting for up to 35% of tree species diversity. Removing trees improved the survival of planted seedlings compared to liana removal, likely due to reduced competition for light. In contrast, lianas negatively impacted drought-resistant *Dipteryx oleifera* Benth. seedlings during the dry season, potentially due to water competition. On a local scale, lianas and trees have distinct impacts on understory dynamics, with lianas potentially exerting stronger competition during dry seasons, while trees compete more intensely for light.

In the pantropical region, liana density increases with reduced precipitation and heightened seasonality. The findings of I. Maréchaux

et al. (2017) suggest that this pattern has led to the hypothesis that lianas demonstrate a growth advantage over trees in dry conditions. Liana leaves were less resistant to drought than trees during the wet season, but achieved similar drought resistance during the dry season. Stronger osmotic adjustments in lianas contribute to maintaining turgor pressure, a crucial precondition for carbon uptake, growth, and liana success compared to trees under drier conditions.

Lianas are a significant component of neotropical forests, and their biomass and numbers are increasing. Lianas are particularly abundant in seasonally dry tropical forests, leading to the hypothesis that they are better adapted to drought and possess an advantage in high-light environments in these forests. Lianas have a deeper root system than trees. They primarily capitalise on growth advantages during wet periods, where they are less vulnerable to cavitation and can achieve high conductivity. However, research by M.T. van der Sande *et al.* (2013) indicates that hydraulic characteristics and functional traits studied do not explain differences in the distribution of lianas and trees in seasonal forests.

The average monthly temperature in July in Kyiv is +20.5°C. Absolute maximum is +39.9°C (August 1898). P.A. Kravchuk (2011) established that air temperature in Kyiv is generally a few tenths of a degree higher than in surrounding cities. The average annual precipitation in Kyiv is about 619 mm. Humidity in Kyiv is most often high. Considering actual weather observations in Kyiv and the global trend of rising annual temperatures, O. Mar'iuik *et al.* (2021) concluded that climate change is occurring within the city. The climatic summer arrives in Kyiv in early to mid-May when the average daily temperature rises above +15°C and typically ends in mid to late September, lasting about one month, or two months longer in particularly hot years.

Drought resistance indicates the ability of plants to maintain an optimal water level in leaf tissues under adverse environmental factors. M.D. Kushnirenko *et al.* (1975) noted that examining and determining drought resistance enables the identification of plant species suitable for cultivation under specific climatic conditions. This can improve the condition of plantings and enhance the technology of their cultivation. Tissue hydration of leaves is an indicator that defines the overall water content within a plant's organs. M.D. Kushnirenko (1975) concluded that leaves are typically the primary part of a plant responsible for photosynthesis and playing a crucial role in moisture retention. They contain a significant amount of water, particularly in cells located within the leaf mesophyll. In dry conditions, especially during water deficit, leaves can lose water more rapidly, resulting in reduced tissue hydration.

In his study, A.I. Kolesnikov (2018) asserted that species of the genus *Aristolochia* L. are widespread in tropical, and less commonly in temperate zones. Species within this genus have simple leaves, often with a heart-shaped form, arranged alternately on petioles. Leaf size varies across species, ranging from 10 to 30 cm in diameter.

Based on these findings, the assessment of plant drought resistance under field conditions revealed no significant signs of wilting among *Aristolochia* L. species. According to S. Piatnytskyi's scale (1961), the evaluated plants received a score of 4, indicating that leaves reduce turgor during the day and recover it at night. In wet conditions, when water availability is high, water content may be higher. Leaf hydration within *Aristolochia* L. lianas can vary depending on the plant's growth conditions. O. Bahatska's data (2008) for the years 2003-2007 suggest slightly higher drought resistance scores ranging from 4.6 to 4.8, despite similar temperature indicators.

N.O. Boiko *et al.* (2019) investigated the biological and ecological properties of woody lianas in Ukraine using a drought resistance assessment scale for the city of Kherson, where drought resistance is a critical indicator. According to their study, the highest drought resistance scores were found only in *Fallopia baldshianica* and *Wisteria sinensis*. Most species exhibited lower levels of drought resistance, ranging from moderately to weakly drought resistant.

Aristolochia bracteolata Lam., belonging to the family *Aristolochiaceae* Juss., thrives even under scorching dry summer conditions. The paper by P. Madhuri *et al.* (2021) described in detail that with moderate to severe water scarcity, the moisture content does not decrease significantly and the high moisture content persists even in conditions of water scarcity. The authors found that with increased water stress, moisture content experienced minimal reduction, indicating the plant's ability to sustain water status even under water scarcity. Elevated tannin content during drought suggests an oxidative role and protection of tannins under arid conditions.

Conclusions

Drought resistance is a vital trait for plants used in vertical greening. It indicates the ability of lianas to withstand physical stress and weight when they grow and cling to support structures. Lianas of the genus *Aristolochia* L. possess sturdy and flexible stems that enable them to bear the weight of leaves and fruits as they grow and intertwine. This characteristic allows them to create intriguing compositions in gardens or around buildings. Lianas exhibit certain adaptations that enable them to be drought-resistant and survive in conditions of limited water availability.

Through studies of drought tolerance in *Aristolochia* L. species growing within the territory of the M.M. Gryshko National Botanical Garden (Kyiv), it has been established that *Aristolochia macrophylla* Lam. is the most drought-resistant species. The average drought resistance indicator is observed in *Aristolochia manshuriensis* Kom. Despite having leaf structures with hairs, which should contribute to better drought resistance, *Aristolochia tomentosa* Sims. did not exhibit such resistance, and it showed the lowest drought resistance among these liana species. In general, analysing the impact of drought on *Aristolochia* L. lianas using field methods has determined that all species can withstand brief periods of drought without significant morphological changes and without losing their decorative qualities. Drought-tolerant foliage enhances the plant's decorative appearance and adds interest. The leaves exhibit attractive colour shades, contributing to their uniqueness.

It is worth considering that the drought resistance of *Aristolochia* L. lianas can also depend on factors such as the condition and quality of the support structures they grow on, which warrants further investigation. In the future, there are plans to examine the creation of plantings for various purposes, especially in conditions with limited water access. This would allow recommending *Aristolochia macrophylla* Lam., *Aristolochia manshuriensis* Kom., and *Aristolochia tomentosa* Sims. species for use in the greening of Kyiv.

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None.

Conflict of Interest

The authors declare no conflict of interest.

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Оцінка посухостійкості рослин роду *Aristolochia* L.

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Анотація. Дослідження стійкості рослин до посухи стає дедалі більш актуальним питанням у зв'язку з глобальним потеплінням. Усі види роду *Aristolochia* L. мають високі декоративні якості та відіграють важливу роль у природних екосистемах. Але в умовах дисбалансу температурного середовища декоративність може знижуватись внаслідок втрати тургору листя і, навіть, його опадання. Метою статті було висвітлення результатів проведених досліджень з оцінки посухостійкості видів рослин роду *Aristolochia* L. для виявлення найбільш перспективних таксонів, придатних для вирощування в умовах м. Київ. Дослідження проводились 2022 році на 3 видах ліан: *Aristolochia macrophylla* Lam., *A. tomentosa* Sims., *A. manshuriensis* Kom., які зростають у Національному ботанічному саду ім. М. М. Гришка (м. Київ). Представлені результати досліджень параметрів показників оводненості листків рослин, водного дефіциту, водоутримувальна здатність листків, рівень електропровідності та питома поверхнева щільність листків, проведених у лабораторії фізіології рослин і мікробіології Інституту садівництва Національної академії аграрних наук України. Також проведено польову оцінку посухостійкості рослин роду *Aristolochia* L. Встановлено, що *Aristolochia macrophylla* Lam. є найбільш посухостійкою, має низький рівень транспірації та має високу водоутримуючу здатність. *Aristolochia tomentosa* Sims. є найменш посухостійким видом, який унаслідок цього потребує додаткового догляду. У польових умовах спостерігали, що істотних ознак в'янення не було виявлено, тобто листки вдень зменшують тургор, а вночі – відновлюють. Важливим також є збереження середовищ, де зростають ці рослини, оскільки їхня зміна впливає на посухостійкість та життєвий цикл ліан. Результати досліджень посухостійкості рослин роду *Aristolochia* L. вказують на перспективність цих рослин. Вони можуть бути використані при доборі асортименту рослин для створення насаджень різного призначення в урбанізованому середовищі

Ключові слова: водоутримуюча здатність; водний дефіцит; оводненість; ліани; електропровідність