WEB OF SYNERGY:
International Interdisciplinary Research Journal
Volume 2 Issue 4, Year 2023 ISSN: 2835-3013
https://univerpubl.com/index.php/synergy

Microclimate and Bioclimate of the Landscape Complex of the City of Tashkent

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Article Information

Received: February 05, 2023
Accepted: March 04, 2023
Published: April 05, 2023

Keywords: *southern and western sectors, an approximate calculation, capital construction.*

ANNOTATION

The formation of the microclimate in Tashkent the zone of green spaces largely depends on the throughput of solar radiation by the crowns of tree plantations of various shapes, the crown parameter, their density and degree of transparency. In this regard, different conditions of shading, heating of the underlying surfaces under the crown, their thermal radiation and convective heating of the air of the adjacent territory are created.

The solar radiation missed by the crowns of trees determines the density of plantings and the closeness of the crowns (closed 1.0—0.9, openwork — 0.8—0.7, through — 0.6), which characterize the degree of transmission of total radiation by the canopy of plantings, which is due to the transparency of the canopy of green plantings e and the height of the sun above the horizon in Tahkent.

Studies have shown that the transmission coefficient of solar radiation of the canopy (in%) of closed green spaces is from 10 to 15, openwork — from 15 to 40, through — from 40 to 60.

Thus, in the crown of the sycamore tree and in the shade under it, its own "microclimate hearth" develops, which differs from the adjacent insulated territory by the following microclimatic indicators: a decrease in air temperature by 2 ... 3 ° C and the pavement surface by 20...22 ° C, a decrease in the intensity of solar radiation by 95%, an increase in relative humidity by 2%, a decrease in wind speed by 28%.

In the crown and under the crown space, depending on the conditions of insolation, the sectors of the greatest coolness effect are formed — the northern, the average effect — the eastern and relatively worst — the southern and western sectors. This pattern is explained by the fact that in the irradiated southern and western sectors of the crown the difference of M at the height marks is much closer to the difference of D T, and vice versa, a significant discrepancy between D1 and DT is observed in the shadow northern sector of the crown and subcronal space.

The results of field studies on a group of tree plantations in order to identify their microclimatic efficiency determined that an array of tree plantations with dense undergrowth contributes to a decrease in air temperature by 4.5...6 °C, pavement surfaces — by 25...28 ° C, a decrease in the intensity of solar radiation — by 98 ... 100%, an increase in relative humidity up to 20%, a

decrease in wind speed — 66 ... 75%.

It is possible to improve living conditions in large industrial cities and influence environmental indicators only by forming an optimal continuous differentiated system of green spaces originating in suburban forests and penetrating into the depths of urban development. In order to improve the sanitary and hygienic and environmental efficiency of green spaces, it is necessary to anticipate the development of the urban landscape, its dynamics, and more widely implement a unified rational architectural and planning solution of the city and suburbs, taking into account landscape zoning and the degree of development of the natural landscape. In each specific case, it is necessary to achieve a reasonable ratio of built-up areas, arrays of green spaces, open spaces, the most optimal indicators of the qualitative and specific structure of plantings (age, completeness, tiering, assortment of trees and shrubs), which have a significant impact on the rate of ventilation, the intensity of solar radiation, humidity, precipitation and the likelihood of fog formation.

Areas with preserved natural landscape (existing plantings, relief, reservoirs, etc.) that are subject to transformation (landscaping, watering) are established on the basis of accounting and a comprehensive assessment of the natural advantages of the area. Additional plantings should not only enrich the landscapes, but also, through the use of an optimal assortment of trees and shrubs, contribute to the effective improvement of the environment, be resistant to adverse effects and durable. The results of the research show that the average concentration of dioxide (SO2) in the air decreases to the maximum permissible (0.05 mg/m3) at the area of forests that make up 35% of the entire territory of the agglomeration, and the maximum concentration is at 38.5%.

Currently, almost all industrial cities have intensively landscaped spaces at the boundaries of development in the form of forest park protective green belts that improve the microclimate and landscape, separating inner-city buildings and suburban areas. In each specific case, based on the size of the city, national economic significance and prospects for its development, taking into account climatic and natural data (the presence of green and watered areas), the need to protect the city from adverse climatic influences — strong winds, snow drifts, dust storms, other external factors and conditions — the boundaries of suburban and green zones are established, landscaping of the territory.

The border of the suburban area of Tashkent runs within a radius of 50-70 km . Around regional centers, green protective zones are located at a distance of up to 30 km, and around district centers — up to 10 km. Green protective zones should have a width of at least 7-8 km, which, with a compact plot, is 5-6 thousand hectares. For an approximate calculation of the required area of green areas of cities, they accept at least 1 person: for the largest and largest — 200 m2, for large — 100 m2, for the rest — 50 m2.

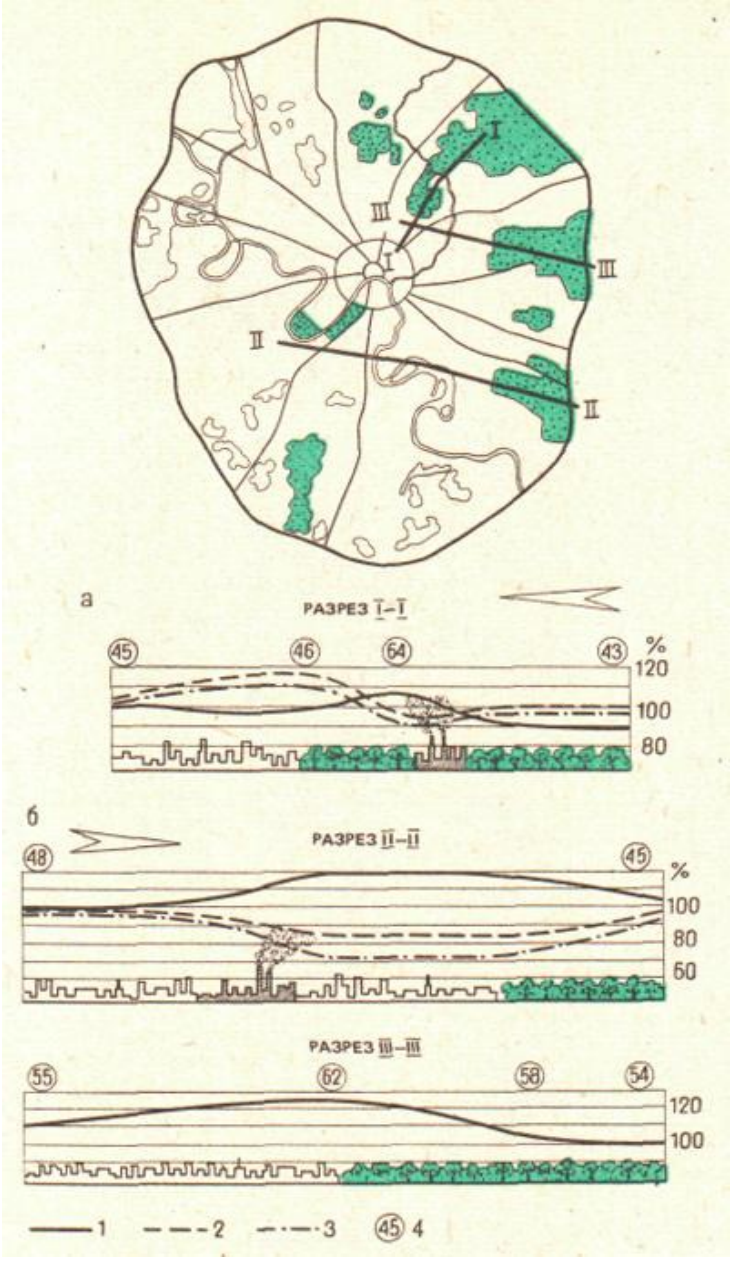
The green zone of the city should represent the most valuable and least modified landscapes that have a beneficial effect on the city. Green spaces have a configuration depending on specific natural conditions in the form of strips and belts, large forest and forest park areas, green spaces along the shores of lakes, rivers, forested hills and mountain ranges adjacent to the city, green islands. At the same time, green zones are used to organize a network of institutions of easily accessible mass recreation without capital construction, to create conditions for free stay, walks, recreational activities in a favorable natural environment, subject to certain restrictions caused by the requirements of nature protection.

The organization of a green protective belt requires the exclusion of economically valuable territories adjacent to the city from forest, water and agricultural turnover and their transfer to a special type of use.

Arrays of green spaces effectively affect the possibility of eliminating undesirable consequences

arising from ill-conceived urban development, excessive concentration of industry and population in them. The green belt around the city not only improves the microclimate of the city, but also prevents the merger of suburban settlements with each other and with urban development.

For cities with a radial-ring planning structure, the optimal landscaping system is formed in the form of green wedges that dissect large urban zones and districts. In such cities, the continuity of the system of green spaces in buildings is created by green "bundles" in the form of boulevards, pedestrian lanes, ski and bike trails, etc., connecting suburban forests, large green areas and green areas of residential areas.



The effects of green wedges on the radiation regime of Tashkent: a — with a north-easterly wind; b — with a westerly wind; 1 — turbidity factor; 2 — ultraviolet radiation; 3 — illumination; 4 — aerosol component

Green wedges with an area of over 600 hectares have the ability in the nearest 2-4-kilometer zone to reduce the concentration of ingredients (according to the sum of indicators) by 2-3 times, which significantly improves the radiation regime (the intensity of visible and ultraviolet radiation increases by 15-25%), the intensity of the "heat island" decreases by 1.2 ° C. Green

wedges are involved in the intensification of ventilation of central districts — in Tashkent frieze-free zones are reduced by 20-25% (according to N. S. Krasnoshchekova and E. S. Semenova). The western, north-eastern and south-western green wedges with access to the suburban area are distinguished by the greatest health-improving efficiency in improving the state of the Uzbekistan environment. Tashkent's northeastern green wedge (National Park) reduces air turbidity by 1.5—2 times, and its effect is not limited only to nearby residential areas, but extends to almost the entire center of the capital.

Within the urban area, the transparency of the atmosphere is very different. However, over the northeastern green wedge, even with a westerly wind direction, the turbidity factor is equally low. In addition, at the same time, in the forest park, it is urgently necessary to neutralize the negative effects of pollutants coming from enterprises and vehicles located in the immediate vicinity. Until it is possible to change the state of the environment in this area for the better, one can only hope for the preservation of the most stable elements of the natural complex.

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