



REVIEW ARTICLE

THE REASONS OF THE FIRES OCCURRING IN SOME ECOSYSTEMS OF AZERBAIJAN REPUBLIC AND THEIR INFLUENCE ON VEGETATION

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ABSTRACT

In the presented article it is given information about succession changes appearing in the forest ecosystems during natural and anthropogenic events occurring in forest ecosystems of Azerbaijan Republic. On the basis of statistical data the factors forming the fires on the woodland were researched, the fire areas and its expansion stages were ascertained, the reasons causing fire were revealed, the fire territories were systematically presented on the woodland. At the same time negative cases as a result of human activity caused changes in the vegetation, and it resulted in increase of invasive species. It was determined that during 5-10 years such plants had created 35-40% of succession processes. In the vegetation invasive-detrimental species prevail in the place of useful plants. In some coniferous forests the broad-leaved trees and bushes were formed.

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INTRODUCTION

On the Earth 172,5 billion tons of organic matter is gathered every year at the expense of plants, 70% of which falls on forests (Asadov et al., 2014). More than 200 billion tons of oxygen is produced by forests every year. But, the climatic changes, anomalous warmths occurring in the world result in change of environment, "shortage" of respiration of the atmosphere (Archibashev, 1985). Change and globalization of the ecologic map of the climate on the Earth is the most serious and dangerous problem of the new age. Global warming and warmth effect have to be appreciated as the most tragic and terrible event procreated by technical progress in the atmosphere in the XXI century as well. Exceeding of normal level of the weather temperature as a result of increase of gases and halogens in the atmosphere being harmful for human organism procreates global warming and warmth effect, as a result, there occur ecologic crises such as aridity and desertification. Warmth effect is mainly generated by influence of carbon dioxide gas.

As a result of use of black coal, oil and its derivatives, gas and other fuels 20 billion ton of carbon dioxide mixes in the atmosphere. It creates warmth effect in the atmosphere, therefore global climatic changes grow even more now. During last 12 years warming speed of the weather has grown thrice in comparison with the previous hundred years (Mammadov et al., 2002). Protection of the nature and rational use of natural resources has been one of the most severe and urgent problems staying in front of the mankind beginning from the period of formation of human society up to the present time. As a result of the latest achievements of biology and speedy technical development, men's domination over the nature becomes stronger and the processes of use of natural resources becomes simpler on one hand, but in other hand it has negative influence on environment, in a word, on the ecologic system. Though men reveal more and more sources of natural resources, the ecologic system is polluted by the extent of application of new technology models in the struggle against the nature, and it has negative influence on fauna and flora. Most of rare plant and animal species disappear, areals of some of them decrease, and harmful and waste primitive plants grow in their place.

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This problem has always been in the spotlight in all social formations, the practical measures have been periodically taken and are taken at present as well. Natural plant cover, vegetation and flora of Azerbaijan Republic undergoing antropogenic influences, endured reduction or complete destruction of number of valuable plant species. And it progressively shows its negative influence on the ecosystem (Red Book of Azerbaijan, 2013). There have been carried out a number of measure systems for protection of rare plant species and the plant species that face danger of extinction in the republic. The major is organization of 14 reserved areas, 17 prohibition areas and 4 national parks in Azerbaijan territory (Ibadullayeva *et al.*, 2014).

Tourists from every part of the world visit our country. Domestic wastes are thrown in different territories, environment is polluted during recreation. First of all the harm is done to drinking water sources, roadsides, the grounds fit for agriculture, the state forest fund and the ecosystem. We all are required to carry out objective public control for preventing throwing of domestic wastes to improper places both in public recreational objects and during daily activity of citizens living in private apartments. Because the role of community in complex protection of natural wealth and their convey to future generations is irreplaceable.

Forest fires also, in turn, do great harm to ecosystem. For preventing the danger of forest fires, first of all, implementation of large agitation works is needed (Andreev, 1986). From little ages the people should be grown in a mind of sympathy with protection of the forests being national wealth, love for nature as well as for forest. In forests everybody has to be careful with fire anytime, and has to help to forest workers to stave off forest fire if it occurs. Propaganda and agitation works should be intensified especially during arid months when fire danger increases. Taking into consideration all above stated we aimed to study succession changes appearing in the forest ecosystems of the territory of Azerbaijan Republic.

THE RESEARCH OBJECT AND METHODOLOGY

Forest ecosystems of Azerbaijan Republic were taken as the research object. Within Azerbaijan the forest areas in Big Caucasus, Little Caucasus and Talish zones were researched. After fires the vegetation was investigated by geobotanical methods (Yaroshenco, 1961), the trainings were carried out in direction of prevention of occurred negative cases. Besides, careless actions of the tourists, guests having rest in forests, resting centers have to be taken under the control, the talks about protection of environment have to be spent with tourists by managers of resting objects (Amasov, 1959). Succession changes that appeared in ecosystems were studied by classic and modern methods (Shennicov, 1962;).

DISCUSSION

The forest fires are mainly generated by people. It may be fire as a result of leaving campfire not extinguished, throwing a cigarette not putting out, a fire from the bullet of a hunter's rifle and etc. For this reason the trainings have been spent within the limits of Azerbaijan in Big Caucasus, Little

Caucasus and Talish regions having forest areas, and it was mentioned that the people of these regions and those who related with forest have to know the reasons of occurrence of forest fires and the way of their extinguishment. Sometimes the forest fires may be generated by lightning. Fire is mostly generated as a result of careless treatment with fire. Presence of a lot of dry trees and wastes create favourable conditions for intensification of occurred fire. Additional ways are made to prevent expansion to other areas of fire that may occur in big forest areas. More fire dangers occur in mass resting areas. Special places are made in such areas for staying. In the periods when fire danger rises because of meteorology reasons mass media has to be used regularly for warning. At the same time for immediate extinguishment of the occurred fire there is great need in assistance of local community living in surroundings.

The recent times in connection of very hot and dry weather in the territory of the country, as well as start of grain cutting season rise of fire danger is inevitable. In this connection the Ministry of Ecology and Natural Resources has to consider reasonable protection of forests and shrubberies by region's directions, municipalities, at the same time implementation of preventive measures for preventing fire cases that may occur in the future, as well as other ecologic disasters. Low trees and bushes, sprouts are destroyed in fire. Trunks and branches of high trees are roasted, therefore their development becomes slower. Thus, substantial succession changes occur in forest ecosystems after fires. Besides as a result of burning of plant remainders the ground is deprived of organic matters. During a fire the animals, microorganisms living on the surface and under the ground are destroyed. Therefore, the harm is done not only to forest but to all ecosystems.

Fire may also occur as a result of throwing of not extinguished match, a cigarette end to forest, sparks going out of car engines. Rags and other materials that contacted with grease oil, benzine, kerosene, diesel fuel and other combustible liquids should not be thrown in forests. It is inadmissible to fill with fuel automobile, tractor and other aggregates with internal combustion engine, as well as smoking and building a fire near them. Recently our country hosts most of the measures being carried out. Especially rest of youth and children organizations, interesting measures, summer camps are spent here as a tourism zone. During such measures building of fire if needed may be organized just in especially allocated places by allowance of the Forest Protection and Restoration Establishment. Burning of wastes also has to be coordinated with that organization in any cases.

EXPERIMENTAL PART

The main source of occurrence of natural fires is the natural processes such as lightning, volcanic eruption, inflammation under influence of the sun and etc. But 60-70% of fire are generated because of carelessness of people. The main reasons of forest fires are the followings:

- not put on cigarette, match being on fire, glass jars (collecting sun rays on glass)
- engine of a transport facility;

- firing of dry grass or wastes near forest;
- clearance of forest and sowing areas by controlled firing.

As a measure against fire the areas bordering upon forest areas, forest roads and other areas having fire danger have to be ploughed in 2-3 meters width, forest should be cleared of wastes, surrounding of any building located in this territory should be ploughed in the radius of 15 meters or be supplied with mineralized stripe against fire. The people should know that danger of forest fires constitute danger for them not by only direct influence of the fire, but also by poisoning because of intense oxygen shortage in the atmosphere, increase of carbon monoxide and other admixtures. Taking into account all of these, during forest fires firstly people and agricultural animals have to be taken out of the dangerous area, entrance in fire area has to be limited, security has to be provided by extinguishment of the fire. The people working in fire area have to use special clothes, helmets, smoke masks, gas masks.

Forest fires cause irreversible incidents in the territory of their occurrence. In the burnt territory restoration process of wood stops, all significant functions of the forest are upset. We should not forget that alongside with destruction of forest the forest fires constitute also big danger for human life. Forest fire spreading by high speed through branches of trees puts an end to life of the people living in that territory as well. Every year complete burning of the villages and settlements during forest fires occurring in the planet results in deprivation of people of their houses in one stroke. As stated above, it is known that as a result of mass increase of plant pests in burnt forests they destroy plant spreading to other forest areas. The harm done by these plant pests is not less than the fire incident. As a result of fire it is done big harm to biologic variety of the forest. Many rare plant and animal species be destroyed. The animals and the birds become deprived of their permanent residence places. As water and ground protection function of the forest weakens, the ground erosion intensifies, the winds winnow fertile ground layer, frequent flows and floods occur, as a result of lessening of the underground waters basins of the rivers become dry. Therefore, invasive harmful plants are formed in the place of the useful plants, and crisis of succession changes starts.

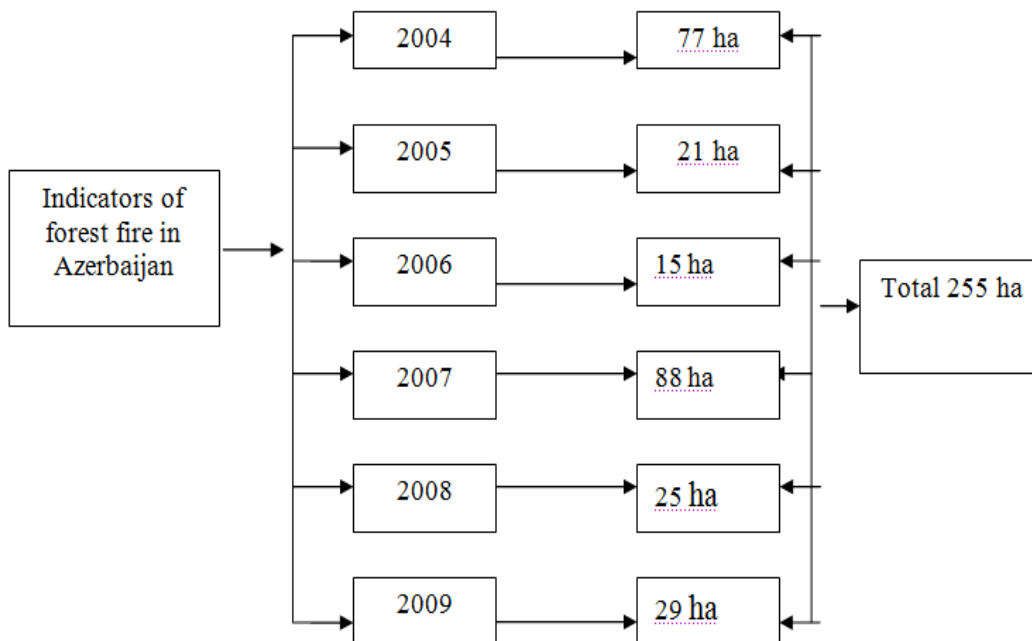
Fires also occur as a result of occasional lightning during arid summer season. As spreading speed of such fire is a little, they cover little areas. There are always observed forest fires after lightning. Such fires mostly occur on the pick of high mountains, on high trees, in the areas with geomagnetic activity (in zones of high radioactive irradiation). Coniferous trees, oak, birch and other plants kindle more easily. It is frequently observed mainly in the Little Caucasus territory of Azerbaijan Republic. The fires occurring as a result of the lightning, proceeding from upper areas of mountain slopes to lower areas, stop in comparatively damp zones. In this case strength of fire and damage of trees is comparatively weak. As the fires after lightning occur mostly in summer season, green vegetation does not allow the fire to spread. But the people coming in forest with different aims mostly generate the fire in autumn and summer months. As green cover is not completely formed or there are a lot of dry grass in these

months, there occur intensive fire incidents, and the forests are seriously damaged in the widest areas. Growth of number of forest fires in recent period causes much economic loss because of destruction of the trees of wood significance in the industrial forests. In some countries (for example, in Russia) quantity of the trees destroyed as a result of forest fires occurring every year equals to woods stocked during the year. Protection of the forest cover from external influences of the ground has special significance. It prevents erosion of ground. Forest cover is completely destroyed during surface and underground fires. And it results in clearance of the ground, reduction of wood growth, increase of pathogenic microorganisms in the forest. Peat layer in a forest grows 1 mm a year. 1000 years is needed for formation of 1m of layer. In the first year after forest fire mineralization of the ground with organic matters proceeds. Afterwards this process weakens and the ground layer becomes poorer. Destruction of the mature trees, change of vegetation, covering of ground with sphagnum moss leads to collection of much damp, turning the territory into swamp and loss of biologic productivity of forest grounds. The fire destroy microorganism on the surface of ground. Oxidation of ground reduces, potassium in ash enriches carbonates with calcium. Mushrooms in burnt area develop poorly or become completely destroyed. A lot of wild grass, bush plants (berry plants, mushrooms, ferns and etc.) are completely lost during strong fire on the ground.

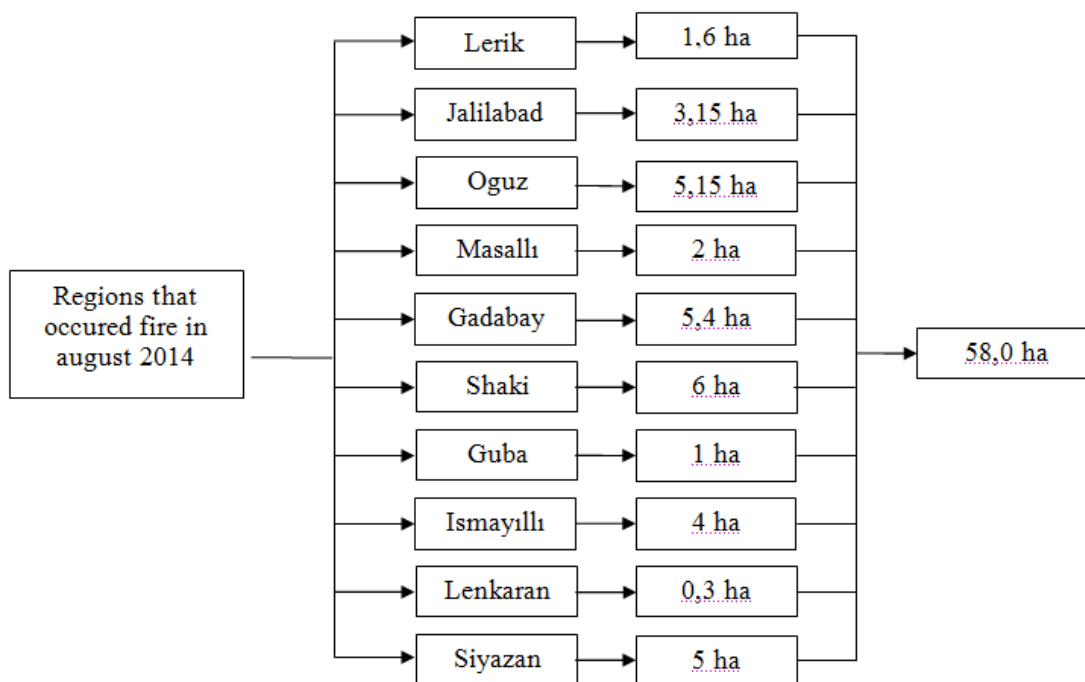
The fires occurring as a result of human activity cover larger territories. They cover even the areas where the lightning cannot influence. The people mostly generate fire on the banks of rivers and lakes, lower mountain slopes. These fires are spread with high speed and do nonrecoverable damage to vegetation. Scanty species in these territories face danger of destruction and some rare tree-bush plants are destroyed completely. During conduction of expeditions it was revealed that potential source of natural fires is bonfires. In many cases the fire is generated intentionally or during technogen incident. Those among people coming to forest for rest and tourists who lack enough ecologic education do not even think of attending to protection of the forest while having pleasure of its blessings.

Sometimes firing sowing areas near forest after reaping also causes forest fires. Uncontrolled fire covering not-dried grass in large territory passes on to nearby forest areas. Gathering and firing of domestic wastes in roadsides or on the verge of sowing areas also causes spreading of fire to large territories. It is impossible to estimate damage done to the forest cover by not put on cigarette end or match. The sparks going out of engines of automobiles of people coming in forest in their private transport are also dangerous sources of fire. One should remember that even spark going out of the most little cigarette lighter may cause undesirable result. The trees which rescued as a result of forest fires also become weaker and undergo attack of pests. Pest insects increasing in burnt territory spreading to other unharmed forest areas make big damage to vegetation. Forest fires destroying coniferous trees create conditions for their replacement by broad-leaved trees, which is a denrologic succession. On mountain slopes forest fires cause clearance of the ground and creation of bare cliffs.

Indicators of the forest fires in Azerbaijan in 2012 – 2015



Fire incidents occurred in forest territories per regions were as follows.



And it grows number of flows and floods in one hand, and in other hand causes lessening of water and drying of rivers and other water basins. When forest fires occur in the regions with dry climate restoration of forest cover becomes imposible. Gradually woodlands are replaced by steppes. As a result winnowing of grounds by wind results in desertification. Just for this reason protection of forests being unparalleled gift of the nature is civic duty of all in general and everybody separately.

Conclusion

- The main reasons causing forest fires are the followings: not extinguished cigarette; burning match; glass jars (collecting glass rays); engine of a transport facility; dry grass during forest fires; firing of wastes near a forest; clearance of forest and sowing areas by controlled fire; uncontrolled firing of straw in sowing areas; fire generated by bullet from a hunter’s rifle.

- The main source of natural fires are natural accidents: influence of the sun, volcanic eruption, lightning. The lightning occurs in 4 places: on the peak of high mountains, on high trees, in coniferous trees, oak, birch and other plants. Fire danger is great in the areas with geomagnetic activity (also in zones of high radioactive irradiation).
- The factors influencing spreading of fire in forests: warmth of the weather (over 25°C), relative humidity (lower than 30-40%), wind speed, direction of air current. (scheme 3) Statistic data of recent year show that number of forest fires under influence of natural and anthropogenic factors gradually grows. Tens of local forest fire incidents occur in the protected territories every year. As a result the range of material damage of forests continuously grows.
- The research work done for establishment and systematic presentation of the factors generating fires in forest cover resulted in the followings.

On the basis of statistical data the factors forming the fires on the woodland were determined, the fire areas and its expansion stages were ascertained, the natural factors or reasons causing fire were detected, the fire territories on the woodland were systematically presented, and succession changes of the botanic structure were revealed.

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