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ҚҰС ФАБРИКАСЫНЫҢ ЛАС АҒЫНДЫ СУЛАРЫН СУДА ӨСЕТІН ӨСІМДІКТЕРМЕН БИОЛОГИЯЛЫҚ ЖҮЙЕДЕ ТАЗАРТУ

Осы мақалада құс фабрикасының өндіріс аумағынан шығатын лас ағынды судың мәселесі қарастырылған. Құс фабрикасынан шыққан қалдықтарда органоминералдық компоненттің қоспалары көптігімен ерекшеленеді. Лас ағынды суды тазартуда тиімділігін көтермелеуі үшін, суда өсетін өсімдіктермен биологиялық тоғанды қолданудың келешегі зор болып табылады.

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HIGHER WATER PLANTS IN THE BIOLOGICAL WASTEWATER TREATMENT OF POULTRY

In the article are considered problems of sewage coming from the industrial zones of poultry farms. Poultry farms waste characterized by a high concentration of organic components. Application of biological ponds with higher water plants is the most promising to improve the efficiency of wastewater treatment. This method is based on a virtually unlimited ability of higher plants in the process of their life to use variety of substances contained in wastewater.

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CHANGING OF HYDROCHEMICAL REGIME OF THE SYRDARYA RIVER

Abstract

This article presents the dynamics of changes of some hydrochemical regime's characteristics of the Syrdarya River. Series of observations with different duration from 23 to 70 years are used for analysis. Total mineralization of water and biochemical oxygen demand (BOD) are selected as analyzed elements.

Key words: hydrochemical regime, hydrological regime, stream, valley, total mineralization of water, biochemical oxygen demand.

Intorduction

At present time, the problem of good water quality is becoming increasingly important, population is concerned not only in quantity, but also in quality of water, that they use for different needs daily. The problem of poor water quality of the Syrdarya River is known since the Soviet times, when water was predatorily taken away from the river for irrigation of nearby

territories, and then drainage runoff had fallen into ground and surface water. Due to return water from irrigated areas, the quality of surface and groundwater has deteriorated significantly. Therefore, at this stage of development of the Republic of Kazakhstan, water supply of the population and reconstruction of the Small Aral Sea is one of the most important tasks.

Hydrochemical alignments were selected to identify multi-year changes of hydrochemical indexes of the Syrdarya River water:

1) the Syrdarya R. – Kokbulak village;

2) the Syrdarya R. – Tyumen-Aryk station;

3) the Syrdarya R. – Kyzylorda city (0.5 km above town).

Series with different length of observations are taken for analysis: 1) Kokbulak village – 1940-2010 years (total mineralization of water), 1959-2010 years (BOD); 2) Tyumen-Aryk station – 1950-2010 years (total mineralization of water), 1987-2010 years (BOD); 3), Kyzylorda city (0.5 km above town) – 1945-2010 years (total mineralization of water), 1968-2010 years (BOD) [1, 2].

Material and methods

The results obtained at the analysis of hydrochemical data are well illustrated at the graphs of sliding ten-year average values (Pic. 1-6). Dotted lines represent periods, when the data was insufficient (there were values less than 5 years in this decade), periods of absence of the data are marked by gaps of the curves.

Dynamics of changes of total mineralization of water during flood period (April – September). In accordance with Pic. 1 the growth of total mineralization of water in all three selected for calculations alignments is clearly traced. In the Syrdarya R. – Kokbulak village alignment the increase of total mineralization of water occurred in 1.9 times – from 554 mg/l to 1034 mg/l (if we take outermost moving values), and if we scrutinize a trend line – in 1.8 times (from 650 mg/l to 1190 mg/l). Total lack of data is observed from 1946 to 1958 years.

In the Syrdarya R. –Tyumen-Aryk station alignment total mineralization of water had increased in 1.5 times in comparison of outermost values of entire observation period (from 598 mg/l to 885 mg/l), such clear variation is not traced at the trend line – from 1,000 mg/l to 1080 mg/l. The data is completely absent from 1997 to 2006 years.

In the Syrdarya R. – Kyzylorda city alignment the increase of total mineralization of water is occurred in 1.6 times – from 580 mg/l to 941 mg/l, by the trend line – in 1.3 times (from 900 mg/l to 1200 mg/l). These changes clearly seen in Pic. 1.

Dynamics of change of total mineralization of water during the period of the highest water discharges (May – August). For more detailed analysis of the changes of hydrochemical regime of the Syrdarya River during flood period, the period of the highest water discharges was selected (May – August), this period includes the peak of flood. As in previous case, there is an evident increase of total mineralization of water in all three alignments (this is clearly seen in Pic. 2).

In the Syrdarya R. – Kokbulak village alignment the increase of total mineralization of water grew from 438 mg/l to 1008 mg/l (in 2.3 times) in comparison of outermost values, and by the trend line – in 2.3 times – from 470 mg/l to 1100 mg/l. The data is completely absent from 1946 to 1958 yaers.

In the Syrdarya R. – Tyumen-Aryk station alignment total mineralization of water increased in 1.6 times (from 559 mg/l to 913 mg/l), by the trend line such evident increase is not traced – from 1000 mg/l to 1100 mg/l. There is a complete absence of data from 1997 to 2006 years.

In the Syrdarya R. – Kyzylorda city alignment the biggest increase of mineralization of water has seen: in 1.8 times (from 516 mg/l to 931 mg/l) in comparison of outermost values, by the trend line the increase is in 1.6 times (from 780 mg/l to 1250 mg/l).

Dynamics of change of total mineralization of water during winter mean water period (December – February). As in previous calculated periods in winter mean water period there is an overall growth of mineralization of water in all three selected alignments is also marked.

In the Syrdarya R. – Kokbulak village alignment the growth of total mineralization of water is observed in 1.2 times – from 725 mg/l to 851 mg/l (if we compare the outermost values), and by the trend line – in 1.7 times (from 630 mg/l to 1100 mg/l). There is no data in period from 1947 to 1970 years.

In the Syrdarya R. – Tyumen-Aryk station alignment in comparing outermost values it's determined that the mineralization increased in 1.1 times – from 783 mg/l to 850 mg/l, according to the trend line, there is also an implicit growth – from 1050 mg/l to 1150 mg/l. However, picture 3-b clearly shows that the peak value of total mineralization of water was observed in 1975-1984 years. It should be noted that there is a complete absence of data from 1997 to 2006 years.

In the Syrdarya R. – Kyzylorda city alignment if we compare outermost values, we can conclude that the mineralization of water increased in 1.6 times (from 661 mg/l to 1052 mg/l), by the trend line the increase is more clearly – in 1.6 times (from 900 mg/l to 1400 mg/l). These changes of hydrochemical regime are clearly presented in Pic. 3.

Dynamics of changes of BOD_5 during flood period (April – September). In the Syrdarya R. – Kokbulak village alignment BOD increasing is from 0.03 mg/l to 1.30 mg/l if we compare the outermost values, and if we see on the trend line, we can consider that the increase was in 1.3 times (from 1.50 mg/l to 2.00 mg/l). In this alignment there is a growth of BOD, while in the other two there is a decrease of BOD. However, if we consider the period from 1987 year there is a noticeably reduction of BOD in this alignment.

In the Syrdarya R. – Tyumen-Aryk station alignment there is a decrease of BOD in 1.4 times – from 2.60 mg/l to 1.80 mg/l in comparison of outermost values, by the trend line – the decrease is more explicit – in 1.7 times (from 2.60 mg/l to 1.50 mg/l). There is a completely absent of data from 1997 to 2006 years.

In the Syrdarya R. – Kyzylorda city (0.5 km above the town) alignment the BOD has decreased in 2 times – from 3.00 mg/l to 1.50 mg/l, according to the trend line – in 1.5 times – from 2.25 mg/l to 1.50 mg/l. The data changes of hydrochemical regime can be graphically seen in Pic. 4.

Dynamics of changes of BOD_5 during the period of the highest water discharges (May – July). In the Syrdarya R. – Kokbulak village alignment increase of BOD is observed from 0.01 mg/l to 1.10 mg/l in comparison of outermost values, by the trend line the growth of BOD is occurred in 2 times – from 1.00 mg/l to 2.00 mg/l. It should be noted that there is a complete absence of data in the period from 1973 to 1984 years.

In the Syrdarya R. – Tyumen-Aryk station alignment BOD has decreased in 1.5 times – from 2.70 mg/l to 1.80 mg/l in comparison of outermost values, if we see at the trend line the decrease is more significantly – in 1.9 times (from 2.70 mg/l to 1.40 mg/l). There is no data in the period from 1997 to 2006 years.

In the Syrdarya R. – Kyzylorda city (0.5 km above town) alignment there is a reduction of BOD in 1.3 times – from 1.80 mg/l to 1.40 mg/l in comparison of outermost values, by the trend line the decrease was in 1.1 times – from 1.80 mg/l to 1.65 mg/l. Changes of BOD_5 concentrations could be seen in Pic. 5.

Dynamics of changes of BOD_5 during winter mean water period (December – February). In the Syrdarya R. – Kokbulak village alignment there is an increase of BOD in 1.3 times (from 1.10 mg/l to 1.40 mg/l) in comparing of outermost values, by the trend line – in 1.4 times (from 1.40 mg/l to 2.00 mg/l). There is no any data in the period from 1972 to 1981 years.

In the Syrdarya R. – Tyumen-Aryk srarion alignment the reduction of BOD is in 2.4 times (from 2.40 mg/l to 1.00 mg/l) in comparing of outermost values, by the trend line – in 3 times (from 3.00 mg/l to 1.00 mg/l). There is a total absence of data from 1997 to 2006 years.

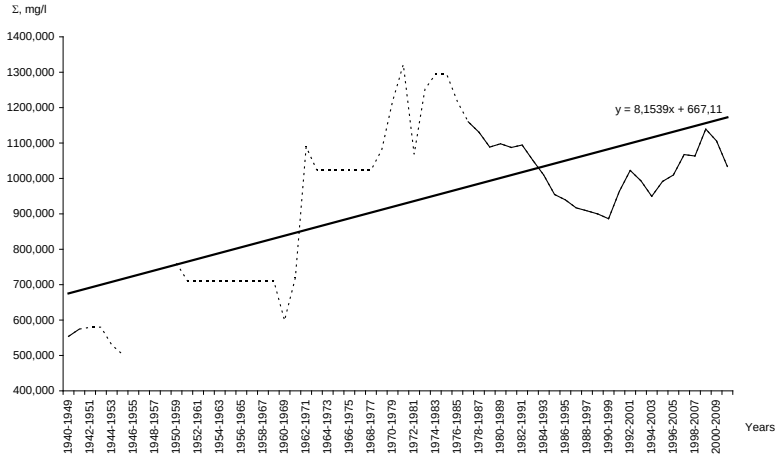
In the Syrdarya R. – Kyzylorda city (0.5 km above town) alignment there is a reduction of BOD in 2.1 times (from 3.20 mg/l to 1.40 mg/l) in comparing of outermost values, by the trend line the decrease is less explicit – in 1.9 times (from 2.80 mg/l to 1.50 mg/l). Changes of BOD_5 concentration in low water period can be represented graphically in Pic. 6.

Conclusion

From the above analysis we can conclude that on the one hand the total mineralization of water of the Syrdarya River is increased, reaching values greater than 1000 mg/l in 2010; on the other hand the same values of BOD_5 are decreased in time in two alignments (Tyumen-Aryk station and Kyzylorda city), only in one alignment there is an some increase of BOD_5 (Kokbulak village).

Applications:

a)



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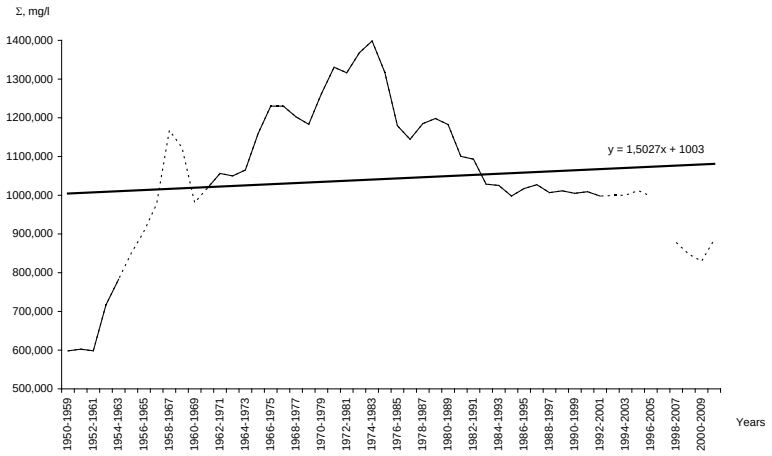

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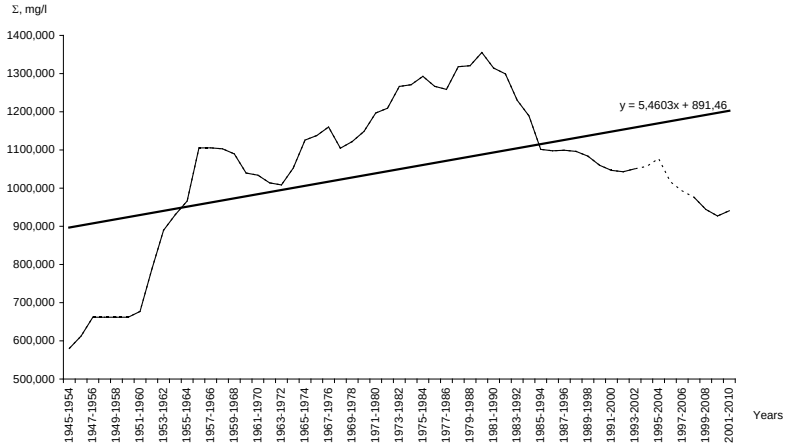
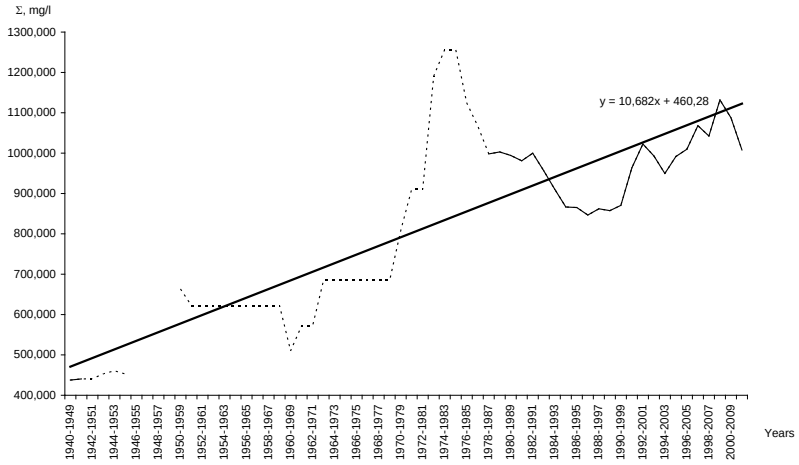
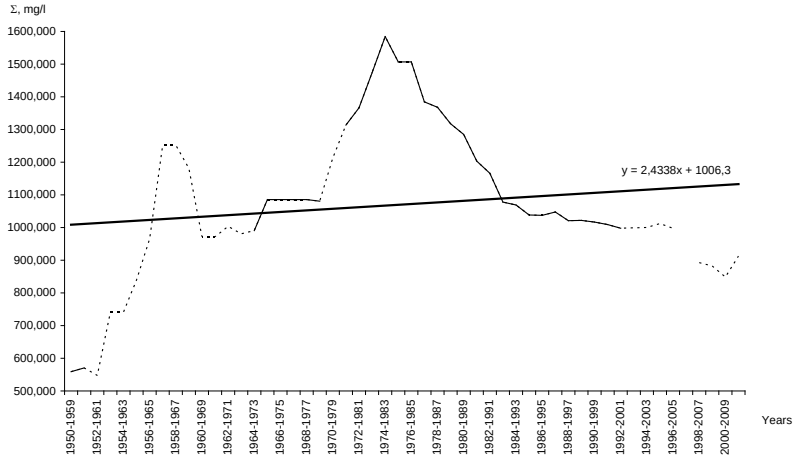


Pic. 1. Sliding ten-year average values of total mineralization of water during flood period in alignments: a – the Syrdarya R. – Kokbulak village; b – the Syrdarya R. – Tyumen-Aryk station;c – the Syrdarya R. – Kyzylorda city (0.5 km above town)

a)



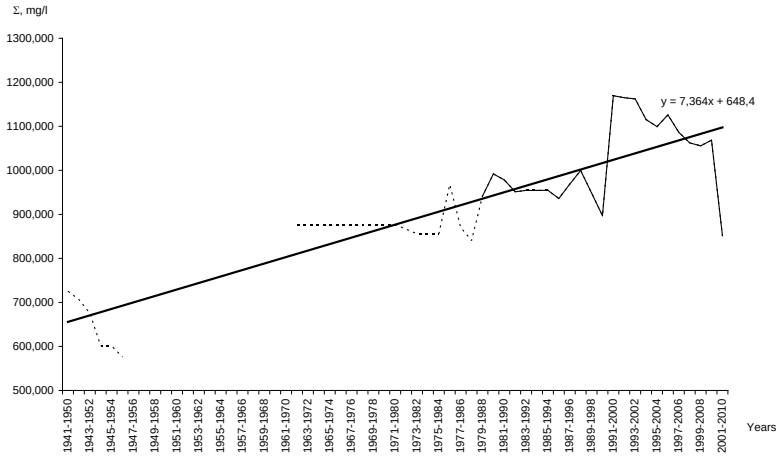
b)



c)

Pic. 2. Sliding ten-year average values of total mineralization of water during the period of the highest water discharges in alignments: a – the Syrdarya R. – Kokbulak village; b – the Syrdarya R.–Tyumen-Aryk station; c – the Syrdarya R.–Kyzylorda city (0.5 km above town)

a)



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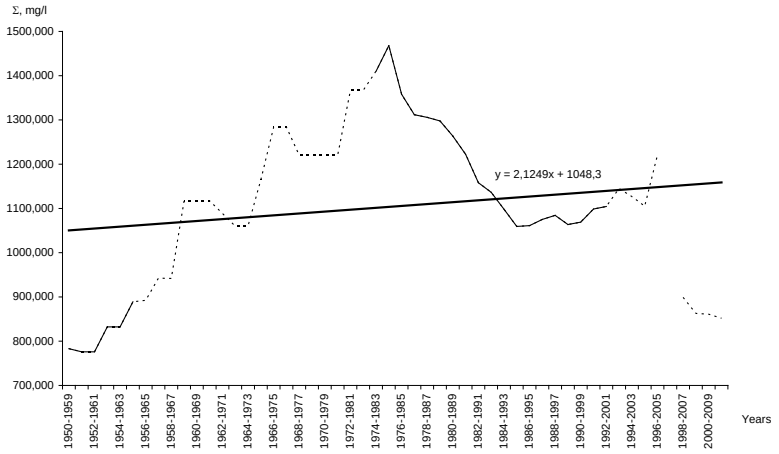
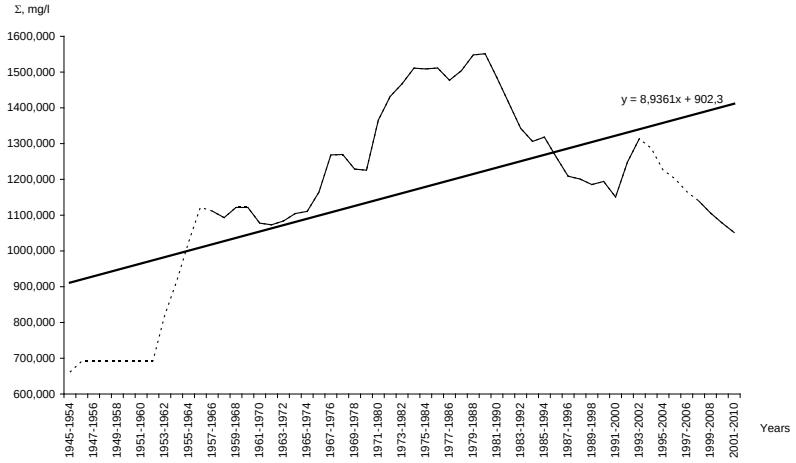
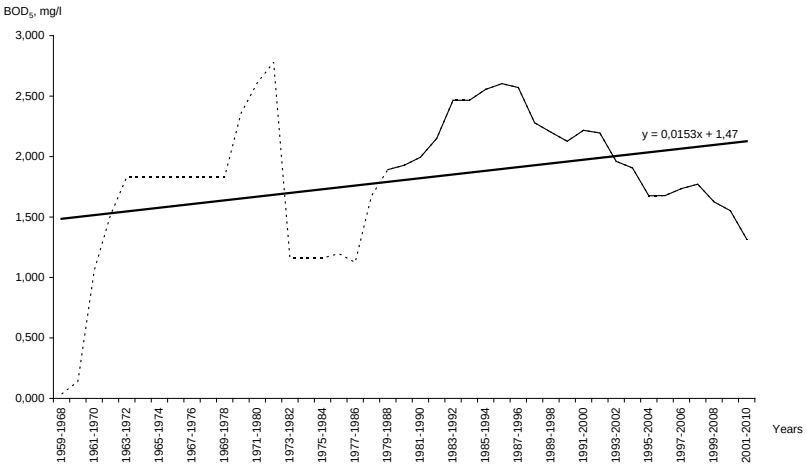


c)

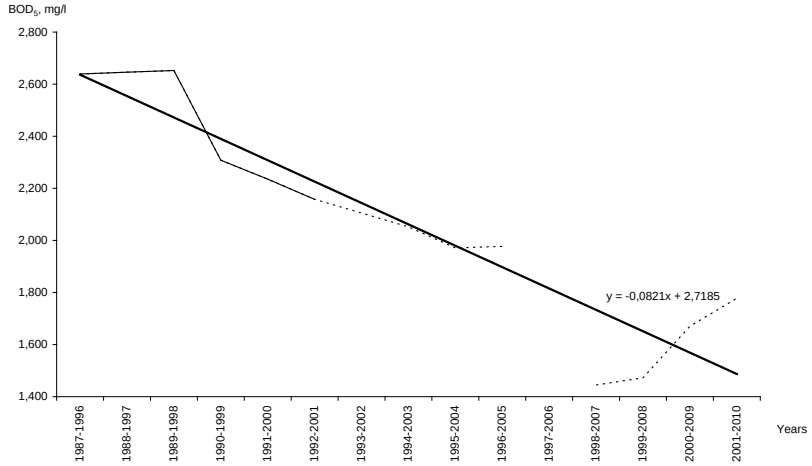


Pic. 3. Sliding ten-year average values of total mineralization of water during winter mean water period in alignments: a – the Syrdarya R. – Kokbulak village; b – the Syrdarya R. – Tyumen-Aryk station;c – the Syrdarya R. – Kyzylorda city (0.5 km above town)

a)



b)



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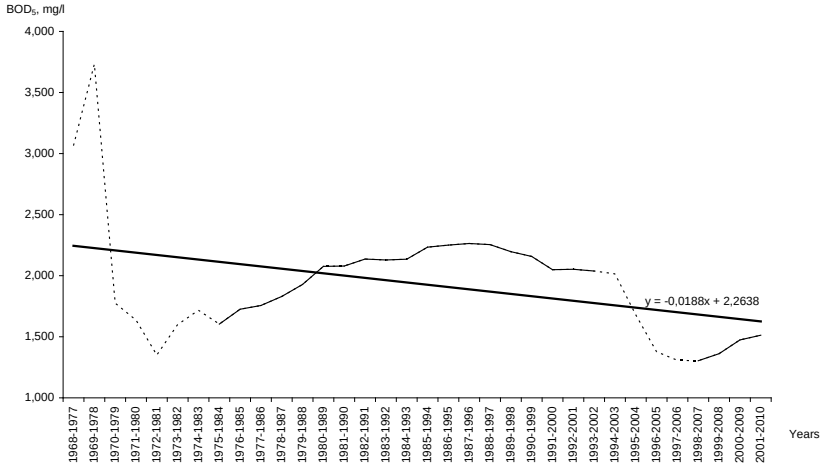
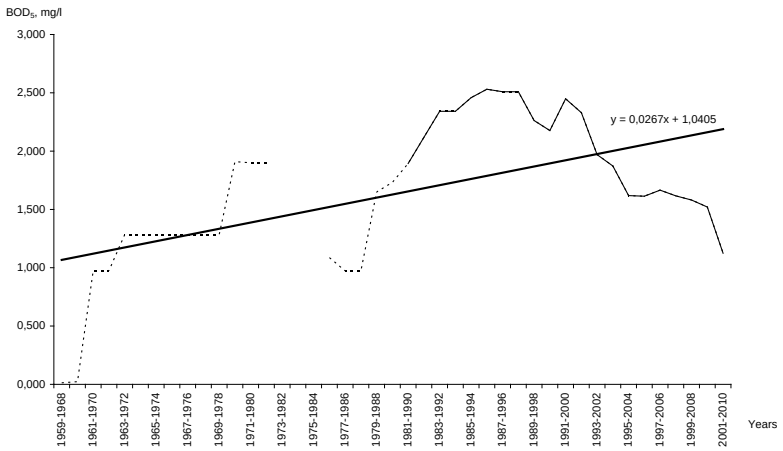


Pic. 4. Sliding ten-year average values of BOD_5 values during flood period in alignments: a – the Syrdarya R. – Kokbulak village; b – the Syrdarya R. – Tyumen-Aryk station; c – the Syrdarya R. – Kyzylorda city (0.5 km above town)

a)



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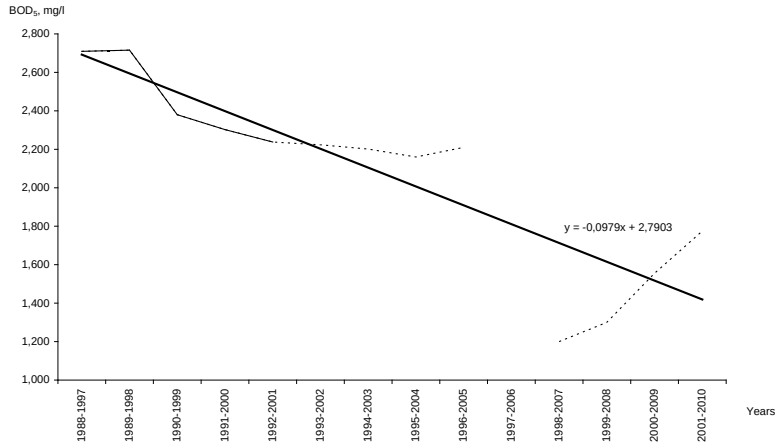
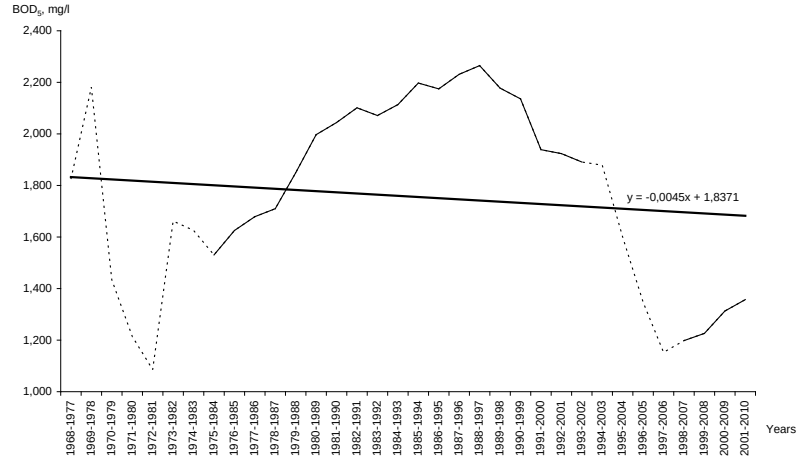
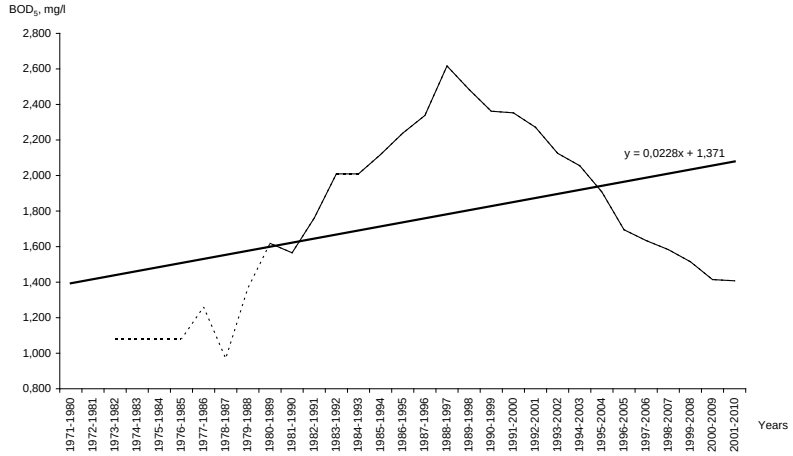


c)



Pic. 5. Sliding ten-year average values of BOD_5 values during the period of the highest water discharges in alignments: a – the Syrdarya R. – Kokbulak village; b – the Syrdarya R. – Tyumen-Aryk station; c – the Syrdarya R. – Kyzylorda city (0.5 km above town)

a)



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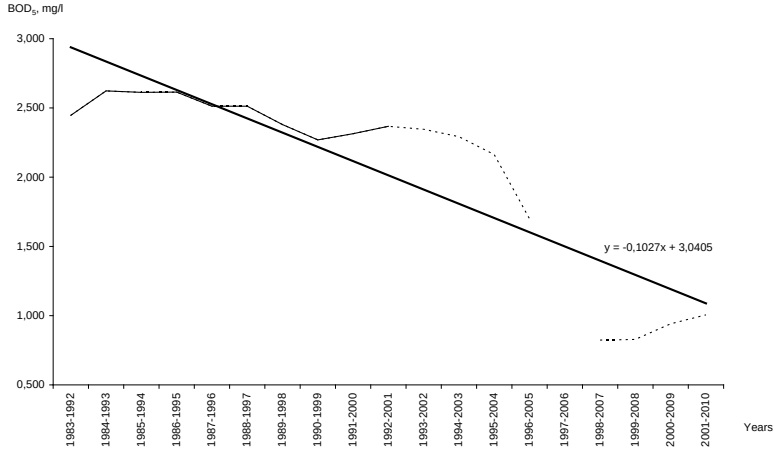

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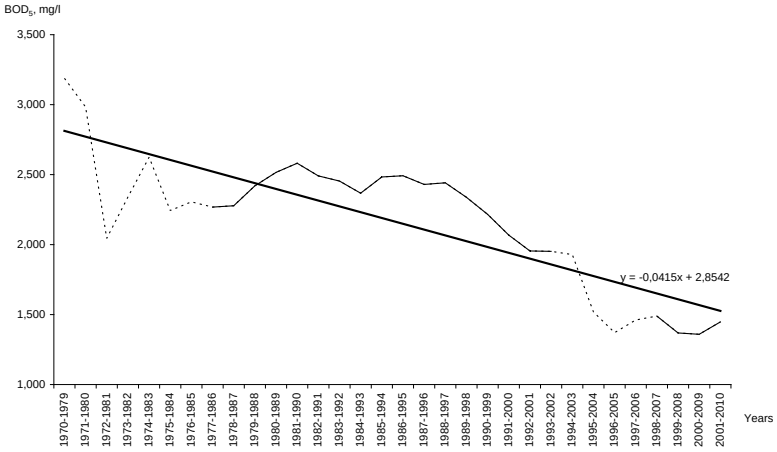

Pic. 6. Sliding ten-year average values of BOD_5 values during winter mean water period in alignments:
a – the Syrdarya R. – Kokbulak village; b – the Syrdarya R. – Tyumen-Aryk station;
c – the Syrdarya R. – Kyzylorda city (0.5 km above town)

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СЫРДАРИЯ ӨЗЕНІНІҢ ГИДРОХИМИЯЛЫҚ РЕЖИМІНІҢ ӨЗГЕРУІ

Бұл мақалада Сырдария өзенінің гидрохимиялық режимінің кейбір динамикалық өзгеруінің сипаттамасы келтірілген. Зерттеулерге қолданылған көп жылдық бақылаулар алынды – 23 жылдан 70 жылға дейін. Оттегін биохимиялық тұтыну (ОБТ) және жалпы судың минерализациясының сапасының элементтері.

Кілт сөздер: гидрохимиялық режим, гидрологиялық режим, ағын, аңғар, жалпы су минерализациясы, оттегін биохимиялық тұтыну.

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ИЗМЕНЕНИЕ ГИДРОХИМИЧЕСКОГО РЕЖИМА РЕКИ СЫРДАРИЯ

В данной статье представлена динамика изменения некоторых характеристик гидрохимического режима реки Сырдария. Для анализа используются ряды наблюдений различной продолжительности – от 23 до 70 лет. Общая минерализация воды и биохимическое потребление кислорода (БПК) выбраны в качестве анализируемых элементов.

Ключевые слова: гидрохимический режим, гидрологический режим, поток, долина, общая минерализация воды, биохимическое потребление кислорода.

УДК: 581.44.524:582.736.58

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ЮКГУ им. М.Ауезова, г. Шымкент

ХОЗЯЙСТВЕННАЯ ЦЕННОСТЬ РАЗНЫХ ВИДОВ АСТРАГАЛОВ
В УСЛОВИЯХ ЮЖНОГО КАЗАХСТАНА

Аннотация

Изученные 3 вида в аридной зоне юга Казахстана характеризуются ценными кормовыми достоинствами, отличаются высоким содержанием кальция и БЭВ. По продуктивности и хозяйственной ценности особо выделяется A.alopecias, характеризующийся наибольшей олиственностью растений, стабильным плодоношением и наибольшей питательностью.

Объектами исследований послужили 3 вида из рода Astragalus сем.FabaceaeLindl.: Астрагал Турчанинова- AstragalusturczaninoviiKar.etKir., астрагал лисовидный -A.alopecias Pall. и астрагал изогнутый- A.flexus Fisch. Работа выполнена (200-2013гг.) в двух опытных участках «Бахтыолен» и «Физкомплекс» РГП «Юго-Западный научно-производственный центр животноводства и растениеводства», участки расположены в равнинной зоне пустыни Кызылкум и предгорном поясе Западно-Тяньшанской горной системы, Южно-Казахстанской области. Климат территории резко континентальный с жарким, сухим летом и довольно сухой зимой, сильными ветрами, неустойчивым снеговым покровом. Среднегодовое количество осадков за годы исследований составило в пустынной зоне – «Бахтыолен» от 108 до 312мм, (средняя многолетняя 183,9мм), среднемноголетняя температура 13,6°С. В предгорной зоне «Физкомплекс»- среднегодовое количество осадков составило от 484 до 869мм, (средняя многолетняя 638 мм), среднемноголетняя температура воздуха 13,4°С. Почвенный покров опытного участка «Бахтыолен» представлен сероземом светлым, супесчаного механического состава, «Физиологический комплекс» сероземом обыкновенным. Растительность участков преставлена эфемерово-разнотравно-туранополынной и эфемерово-эфемероидной ассоциациями. Хозяйственная ценность астрагалов изучена путем определения химического состава листьев, стеблей, репродуктивных органов в фазе цветения и начала плодообразования. Содержание сырого протеина устанавливалась методом Кьенделя, сырого жира -методом эфирной экстрации в аппарате Сосклета, сырой клетчатки и безазотистых экстрактивных веществ - по разности золы путем сухого озоления. Количество кальция в золе определяли путем осаждения его