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DEVELOPMENT OF THE INFORMATION SYSTEM FOR MONITORING, MODELPREDICTION OF CHANGES IN THE QUALITY OF THE ENVIRONMENT AND PUBLIC HEALTH INDICATORS OF INDUSTRIAL REGION, STUDYING THE ANATOMICAL COMPOSITION OF PUMPKINS FROM USEFUL COMPONENTS OF FLORA FOR HUMAN HEALTH

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Summary; **In the developed information system for monitoring the southern industrial region and a model of ecological environment quality forecast changes in the environment, public health indicators and studied the anatomical structure of domestic varieties of pumpkins for the intended use as a useful component of the natural environment of the plant world for human health.**

The results of our study has social value, and has scientific basis for developing a broad system of comprehensive preventive measures to improve the health of the population.

In the study of complex phenomena time sequence of occurrence of characteristic values becomes essential. As a result of the observations historical series, also called as dynamic series or time series were constructed. Special statistical processing methods were developed for such series. Regression were constructed for multivariate time series.

Keywords; **information system, monitoring, industrial region, the forecast model, the ecological environment quality, environmental, health indicators, anatomy pumpkin**

For targeting of health interventions in the population, it is necessary to have data not only for the study period, but also at the time of the near and distant future [1-4].

To this end, we have developed a model changes the quality of the prediction of environment and health indicators at the base cities - Zhambyl and Shymkent in time.

Due to changes in the quality of the human environment of modern hygiene, conditions necessitate our ideas about specific environmental factors affecting health outcomes and the level of morbidity.

In this aspect, the results of our study should have the social and economic importance, and should be a scientific basis for developing a broad system of comprehensive preventive measures to improve the health of the population.

In the study of complex phenomena in time, sequence of occurrence of characteristic values becomes essential. By observing the results of building a chronological series, also called as rows of speakers or time series. Special methods of statistical processing were developed for such series. On multivariate time series builds regression.

For example, a linear regression of the time series for the disease may be:

$$\hat{y}_b = b_0 + b_1 x_{t1} + \ldots + b_m x_{tm} \quad (1)$$

The dependent variable y at a certain time or for a certain period of time t is set to:

$$y_t = \sum_{k=0}^{m} b_{tk} x_{tk} + \hat{\varepsilon} + \ldots , \quad (2)$$

where y_t - value of the dependent variable at a certain time t ; b_k - Regression parameter explanatory variable x_k ; x_{tk} - the value of the explanatory variable x_k at time t ; $\hat{y}_t$ - regression value at a certain time t; $\hat{\varepsilon}_t$ - the value of the disturbing variable (balance) at the time t ; t = 1, 2, 3, ... , T; T - number of observation points during the analyzed period of time; K = 0, 1, 2, ... , m - the number of explanatory variables; x_{t0} =1 for all t.

The regression equation is constructed with help of method of least squares, the essence of which is to find the parameters of the model of minimizing its deviation from the original number of points, ie $S = \sum_{i=1}^{n} (\hat{y}_i - y_i)^2 \to \min$ (3)

where $\hat{y}_i$ - the calculated values of the original series; y_i - the actual values of the original series; n - number of observations. One of the problems of building the regression of the time series is a mismatch in time of cause and effect.

For example, the incidence of the value recorded for the year is a result of reasons, not only acting in the same period of time, but in the preceding period.

The delay values of statistical series relative values of different statistical series - regardless of the reasons is called the lag. Causation statistical series can be correlated with each other and build on them regression adjusted for lag. If it is known that the effect of factor occurs only in two successive observation period, in constructing one of the values of the regression rows are shifted by the two gaps.

In the construction of regression models is often necessary to resort to the inclusion of the right side of the lagged values of the explanatory variables. The regression equation taking into account the lagged (delayed) variables is written as:

$$\hat{y}_t = b_0 + b_1 x_{t-\tau,1} + b_2 x_{t-\tau,2} + \ldots \quad (4)$$

In practical trials as a time series regression models generally uses the following functions:

- linear y=ax+b ;
- quadraticy= ax^2 +bx+c ;

- power of y= x^{Π};

- indicative y= a^{x};

- exponential y= ae^{x};

- logistics y= $\frac{a}{1+be^{-cx}}$;

Formally, the regression of the time series can be built, and that regression statistical series, constructed by the results of simultaneous observations, is used as an independent variable in the observation period.

The table below shows the parameters of disease regression equations, depending on the period in years in Shymkent and Zhambyl cities.

For all types of disease regression equations are:

y= $a_0 e^{a_1 t}$, where t=T-1985; T=1986, 1987, ... , 1996.

The coefficient of determination (R^2) shows several model (regression) corresponds to the actual data ($0 \leq R^2 \pm 1$). Closer R^2 to 1, the better.

Conducted by us prognostic calculations show that, while maintaining the current level of industrial production in the city of Shymkent in the next 3-5 years there will be a decrease in the level of air pollution with sulfur dioxide and nitrogen oxide. Sulfur dioxide concentration in the atmosphere, according to our calculations, by 1995, must be reduced 6 times compared to 1986, while nitrogen oxides - 2-2.5 times. However, in terms of the city opposite the forecast for expected air pollution benzo (a) pyrene and heavy metals. So, in our predictive calculation in the air in Shymkent for 1995-1998 year compared with 1986, will increase the concentration of benzo (a) pyrene to 10 times, manganese - 5-6, zinc - 6-8 and dust - up to 2 time.

Our predictive calculations for the next period (. 1996-1998) show that air pollution in Zhambyl carbon monoxide increases 1.8 times, nitrogen oxide - 2, nitrogen dioxide - up to 4.0, the dust - in 3, 0, ammonia - in hydrogen fluoride and 2.2 - 2-fold (the application).

In this case, as shown by the results of our research, almost at the same level, the level of diagnosis of medical aid to the population in the cities. Shymkent and Zhambyl incidence of residents is not the same. It is higher in the city of Shymkent, and is relatively low in Zhambyl. At the same time, are ambiguous and projected levels of pollution in the two cities of the environment. It has defined our task prognostic calculations levels of some of the most common diseases of the population in these regions.

If before 1997 the incidence of chronic bronchitis population in the cities Shymkent and Zhambyl was approximately the same, in the next years, as a whole, it has sharply increased in the city of Shymkent. Prognostic calculations show that up to 2006 the incidence of the population of Shymkent chronic bronchitis increases compared to 1996 by almost 4 times, while the Zhambyl it increased by 2 times.

Further, the incidence of diabetes mellitus in population of Shymkent is almost 2.0 times higher than residents of Zhambyl and the growth rate is much higher than the latter.

Predictive calculations show that the incidence of diabetes mellitus population in Shymkent by 1996 will increase by 2.1 times compared to 1996, whereas in Zhambyl it increases by 1.2 times.

The most interesting results were obtained while calculating the prognostic of disease thyrotoxicosis. By 2006, the incidence of their population of Shymkent has fallen by almost 3.0 times. At the same time the population of Zhambyl it increases by 3.2 times.

The incidence of cardiovascular diseases for Zhambyl population is higher than the inhabitants of the city of Shymkent. By 2006, according to our estimates, it is expected to increase in the incidence of hypertensive disease of the population of Zhambyl almost 4.5 times, and in Shymkent - . 1.5. Prognostic calculations show that the incidence of coronary heart disease population of Zhambyl also exceeds that of Shymkent.

However, the incidence of the population of the two cities of gastric ulcer and 12 duodenal ulcer the opposite is true. By 1996, this pathology will exceed that of the residents of Zhambyl and increased 2.0 times among the residents of the city of Shymkent in comparison with 1996, while the city of Zhambyl growth of 1.5 times.

Table A. Table settings disease regression equations in the cities. Shymkent and Zhambyl, depending on the time period

Illness	Model type	Determination coefficient R^2	a_0	a_1	Error forecast ($\pm$)
Bright's disease					
Zhambyl	$y= a_0 e^{a_1 t}$	0,7031	24,01	0,166	0,128
Shymkent		0,7885	34,99	0,118	0,226
Stomach ulcer					
Zhambyl		0,51	49,73	0,086	0,175
Shymkent		0,53	53,20	0,10	0,195
Chronical bronchitis					
Zhambyl		0,82	70,16	0,056	0,112
Shymkent		0,96	68,20	0,106	0,101

IBS					
Zhambyl		0,62	48,20	0,112	0,152
Shymkent		0,70	54,82	0,042	0,165
Hypertonic disease					
Zhambyl		0,92	72,40	0,080	0,110
Shymkent		0,85	69,18	0,062	0,112
Thyrotoxicosis					
Zhambyl		0,69	64,52	0,102	0,115
Shymkent		0,75	72,60	0,116	0,135
Diabetes					
Zhambyl		0,49	52,08	0,086	0,135
Shymkent		0,72	44,12	0,042	0,122

The growth rate of the population of Zhambyl with chronic nephritis is ahead among the inhabitants of the city of Shymkent, and by 2006 it increased by 1.9 times. At the same time for the city of Shymkent, too, there is an increased incidence of chronic nephritis of the population, but at a slower pace.

According to the above stated we would study anatomical condition of the pumpkin. The pumpkins are recommended to use in cardio - vascular diseases and hypertension, gastric diseases with high acidity, chronic inflammation of the mucous membrane of the stomach, liver, gall bladder. It is recommended as a diuretic in clinical nutrition.

Cucurbitaceous family includes about 1,100 species of plants belonging to 130 genera. All these plants are annuals, heat-loving, powerful, with large petiolate leaves and juicy fruits polyspermous and cross-pollinating [5].

Sowing area of pumpkin is currently in the Republic of Kazakhstan is about 3,000 hectares. The collection of the gene pool of the Kazakh Research Institute of Potato and Vegetable Growing (KazNIIKO) has more than 3000 samples of 13 species of pumpkin plants. The number of samples given by type as of January 2014. For vegetable pumpkins, important signs are coloring and quality of pulp; coloring and size of the seeds and other features are shown in the characteristics of the samples.

Fruits of vegetable pumpkins contain up to 14% of sugars, especially a lot of them easily digestible glucose. They also contain a starch, pectin and fats. Calorie of pumpkin is from 170 to 316 calories per kilogram of fruit. Mineral substances in a pumpkin is particularly rich for

potassium salts, phosphorus and calcium, which are essential for the human body. Many also have a copper, cobalt, and other trace elements.

Botanical difference between cultivated in our country species and varieties of pumpkin are given in Table 1 [6].

We have investigated the most common and productive varieties of pumpkin, which fruits weight reaches 10 kg or more. Butternut pumpkin is richer for sugars and carotene than other types. It has very small seed slot located at one end of the fruit, the pulp is denser, better quality and higher yield of marketable products. He kept it for longer than other types of pumpkins. However, it is most thermophilic, which hinders its spread in the northern regions. Tverdokoroy pumpkin has a good ease of fruit, but inferior nutmeg on productivity and quality, but at least thermophilic and more prevalent in the northern zone of the country. [6]

For sowing in Kazakhstan State Commission for Variety Testing crops recommends 3 varieties of pumpkin dining.

Karina - large-fruited pumpkin, selection of the Kazakh Research Institute of Potato and Vegetable Farming. This pumpkin has long fruit rounded-flattened, medium-sized, gray and green, sometimes mottled, turn pink during storage. Flesh is thick, medium thickness, very sweet. The average fruit weight from 2 to 6 kg. Seed cavity is medium. Seeds cream-colored, with a dense skin. The variety is middle-yielding. Light and high portability.

Mozoleevskaya 10 - pumpkin, selection of the Kazakh Research Institute of Potato and Vegetable Farming. Plants are the fruits are cylindrical, with ribbing at the stem, light orange when fully ripe. Figure in the form of broad bands spotted at first dark-green color, and when fully ripe – dark orange. The flesh is yellow or cream-colored, 3-5 cm thick, medium density and less sweet. Seed nest is large. Seeds medium oval, yellowish cream with the rim. The average fruit weight of 4.5-7 kg. The variety is middle (102-117 days), yield, with high commodity quality and good taste. The ease and transportability high.

Aphrodite (butternut pumpkin), TC-17, 898-KOH, KazNIIKO selection, the sample obtained from the originator. Fruits are elongated, with a swollen end of the "perehvatki". The tail part of the fruit can take up 2/3 of its length and has no voids. Seed small camera. Painting of orange fruit with a pattern in the form of broken brown obscure bands. When fully ripe pattern disappears. Flesh is dark-orange, sweet, dense. fruit surface smooth, powdery bluish waxy bloom, ribbed at the stem. The average fruit weight 5-8 kg. Yield 30-40 t / ha. Marketability of fruits to 90%. Transportable fruits contain 08.07% solids, 8.6% total sugar, up to 4% carotene kept good. The variety is middle table consumption.

We studied the anatomical features of the varietal composition of the most common in Kazakhstan 3 varieties of pumpkins. The most promising, widely used were the table varieties Karina, Aphrodite and Mozoleevskaya 10 [6].

Studies have shown that the particle size of the fruit (7.0 kg) and the highest content of pulp grades are characterized Aphrodite Mozoleevskaya and 10 (average 85.8% and 80.4%, respectively). A high peel marked varieties and Karina Mozoleevskaya 10, which corresponded to 11.2%. The yield of seeds from the highest grades of Carina (13.5%).

Thus, the study of the anatomical structure of domestic varieties of gourd canteen showed that Aphrodite variety with a high content of pulp (85.8%) is mainly intended for complex processing into puree and juice, and the variety and Karina Mozoleevskaya 10 with higher levels of skin (11, 2%) and seeds (8,4-13,5%) - for further study in them for pectin extraction of pectin and sunflower seeds for the production of pumpkin oil.

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