Chapter 5

Intensity of Biochemical Process in the Irrigative Soils

The soil biological activity is characterized by a biochemical activity of the root system of the high plants and microorganisms. Microorganisms and high plants are in a complicated mutual relation as the whole unit in each landscape. The biochemical activity of each component of the whole unit, their biocenotic mutual relations and environment material structure are defined with the biogeocenotic relations wholly (Khaziyev, 2005). A role of the physical- chemical, biological and biochemical processes which occurs continuously is increase of soil fertility. As a result of the mutual effect of the complex processes as physical, chemical and biological elementary soil processes are formed, the work is based on this scheme: soil plant – vivi paridae; microorganisms-a man (man's activity)-soil microorganisms these determine the soil biological activity (Kharshum, 2005). Evaluating of the soils biological activity is near the fertility level estimation this gives basis to use from *Nitrosomonas* sort ammoniac is oxydized into hydroxiamin the sytochomoxidaza ferment possessing *Cu* in the structure takes part in this reaction (Campbell and et. al., 1967) and are called ammonium oxydaza then turning of hydroxylamine into nitrate by is performed medns of interval reactions, by a participations of hydroxilaminoxidaza, by means of *Nitrobacteria* (Khaziyev, 2005).

Estimation of the biological activity is near the fertility level evaluation, this gives ground to use from biologically activity indicators in learning of the antropogen effect, in soils monitoring and bioindication (Sinchin and et. al., 2000). Depending on ecological condition an intensity and humification of the biological processes change to an important degree (Samedov et. al., 2004). The saprophyte microbes cellulose decomposing microorganisms and nitrificators increase ammonofixing bacteria reduce in agrocenoz in comparison with the natural fitocenoz. Overturning of the soil organic substances which are resulted in formation of mineral form of nitrogen occurs with the microorganisms participation. More of them are active in the environment near the neutral. The researches show that a direction of ammonification and nitrification processes determined by a soil environment reaction on the other hand the process itself effects on soils acidity characters (Orudzheva, 2009).

5.1 Nitrification Ability of the Irrigative Soils

The microorganisms play an important role in nitrogen transformation in the soil. Ammonofixing bacteria, majority of actinomycetes, microscopic fungi and other microorganisms fulfill mineralization of organic substances in soil and decomposition of easy assimilating ammoniac for the plants. Nitrifixing bacteria turn ammoniac into nitrite and nitrate, Using of mineral nitrogen in soil microflora structure and microorganisms turning it are enough. A quantity and quality of the nutrient in soil depend on microbiological processes-soil ammonofication and nitrification ability, cellulose decomposition intensity and ferments activity (Voynova-Roykova and et. al., 1986). Ammoniac nitrogen is oxidized till nitrate form by a participation of nitrifying bacteria under an aerobe condition. In the process of ammoniac oxidizing till nitrate some interval crops form and different oxidizing ferments participate, in the first stage by the bacteria ferments.

Dynamics of the nitrification ability in the irrigative grey-brown soils. Some authors show that nitrification process changes dynamically depending on biology of the plants growing during a season, the soil hydrothermic regime and applying agrotechnics in the grey-brown soils (Babayev and et l., 2009; Orudzheva, 2009; Abasov, 1980; Agabekova, 198; Djumshidova, 987).

An intensity of the nitrification process has been studied in dynamics in the irrigative grey-brown soils under the vegetable and fodder plants. The conducted researches show a change of the soils nitrification ability depending on mutual effect of soil-ecological condition, biotic and a biotic factors. In the researches years an intensity of the soils nitrification ability under the growing plants changed by 38,7-96,9 on the tillage layer on the 1st scheme; 27,5-81,5 on the under tillage layer; 33,1-71,4 and 24,9-62,0 N-NO_3 mg/kg on the 2nd scheme.

In the irrigative grey-brown soils the nitrification activity under an annual lucerne+barley changed by 64,2-89,5 on 0-25 cm of layer (AI^{I}_{a}) 72,3-96,9 under the two-year lucerne, 56,7-73,9 and 60,9-81,5 N-NO_3 mg/kg on the under tillage layer (AI^{II}_{a}), three peaks-according to the nitrification ability-were observed in June, August and October. The higher activity was noted under the two-year lucerne comparatively. It is obvious a strong root system of the lucerne plays a substrate role for occurring of the nitrification process intensively. The mathematic analyses show a change of nitrifixing bacteria activity under the lucerne by 61,3-87,8 N-NO_3 mg/kg, a variation coefficient by 11,60-12,62%.

An intensity of the nitrification ability of the soils under a watermelon changed by 59,1-80,3 on the tillage layer AI^{I}_{a} on the 1st scheme and 52,4-67,6 on the under tillage layer AI^{II}_{a} at the vegetation period: 44,1-63,1 and 35,1-55,6 N-NO_3 mg/kg on the 2nd scheme. An activity in the soils was observed under watermelon in three peaks-June, August and October. An intensity on the constant watermelon tillage changed by 24,3-41,7 on the tillage layer AI^{I}_{a} and 16,9-30,6 N-NO_3 mg/kg on under tillage layer AI^{II}_{a}, an average mark of the activity on the 1st scheme was 34,9 units less (54,2%) than the watermelon version, 18,6 (40,2%) less than the 2nd scheme. The mathematic analyses show that an intensity of the soils nitrification ability formed 69,1±2,148 on the tillage layer AI^{I}_{a} on the 1st scheme; 52,1±2,395 on the 2nd scheme; 34,4±1,980 on the constant tillage; 59,1±1,892 on the under tillage layer AI^{II}_{a}; 43,6±2,456 and

24,1±1,422 N-NO_3 mg/kg, a variation coefficient changed by 12,53-23,75% on the constant tillage in the largest interval.

An activity on the tillage layer changed by 38,0-52,7 on 0-50 cm of layer by being more than under tillage layer and 29,0-46,8 N-NO_3 mg/kg on the 2nd scheme. Two peaks for the nitrification process intensity in the soils under the potato were observed in June and October. The activity was less in July and September; its reason was the potato vegetation period finishing and decrease of the quantity of microorganisms assimilating mineral nitrogen. The nitrifixing bacteria activity changed in the soils under the potato on the constant tillage by 22,3-37,9 N-NO_3 mg/kg on 0-50 cm of layer by reducing along the profile. The mathematic statistic-variation calculations show that the nitrifixing bacteria activity in the soils under the potato was less on the constant tillage and changed by 41,0-55,6 on the tillage layer at the crop rotation, 31,2-37,7 N-NO_3 mg/kg on the under tillage, a variation coefficient changed on the constant tillage in the largest interval.

The nitrifixing bacteria activity in the soils under the garlic was on the upper layers than the low layers, it changed by 38,1-52,9 on 0-25cm of layer ($AI^{I}a$) and 27,5-34,3 N-NO_3 mg/kg on 25-50 cm of layer ((AII^{I}_{a}) at the vegetation period, 2 peaks for an activity were noted in June and October. An intensity of the nitrification process on the constant garlic tillage was less in comparison with the growing plants, changed by 20,1-36,7 on the tillage layer (AI^{I}_{a}) and 14,1-30,1 mg N-$N0_3$/kg on the under tillage layer and an average mark of the intensity was 18,0 units less on the tillage layer than crop rotation (39,6%) and 10,5 units (34,0%) less on the under tillage layer. The mathematic calculations show that an intensity in the soils under the garlic formed 46,5±1,809 on the tillage layer (AI^{I}_{a}), 30,9±1,122 mg N-$N0_3$/kg on the under tillage layer (AI^{II}_{a}), and it was less on the constant tillage. A variation coefficient changed in the largest interval on the constant tillage.

The soils cultivation under a version of white head cabbage+tomato made a condition for keeping of the nitrification processes activity in enough higher level and oxidizations of ammoniac till nitrate during a season. The nitrification process intensity under the white head cabbage+tomato changed by 49,8-79,0 on the tillage layer AI^I_a and 34,9-58,2 mg $N\text{-}N0_3$/kg on the under tillage layer in the research years, three peaks for an activity were observed in June, August and October. An intensity in the soils under the tomato on the 2nd scheme changed by 38,5-52,4 mg $N\text{-}N0_3$/kg on 0-50 cm of layer reducing along profile, three peaks for an intensity were observed in June, August and October. The activity change interval on the tillage and under tillage horizons under the constant whitehead cabbage was 19,3-43,5 mg $N\text{-}N0_3$/kg on 0-50 cm of layer and two peaks for the nitrification process intensity were noted in June and October. A change amplitude of the activity on the constant tomato formed 21,7-42,5 on the tillage horizon AI^I_a and 18,1-32,4 mg $N\text{-}NO_3$/kg on the under tillage horizon AII^I_a. Three peaks for the nitrification ability in the irrigative grey-brown soils were in June, August and October. An average mark of the intensity under the white head cabbage+tomato on the crop rotation was 23,1 units more than constant tomato and 24,2 units (43%) more than the constant whitehead cabbage. The statistic calculations show that the soil intensity under the white head cabbage+tomato version formed 61,3±2,287 on the tillage horizon, 54,8±1,826 under a tomato version on the 2nd scheme, 32,9±2,306 on the constant tillage under the whitehead cabbage, 34,3±2,245 mg $N\text{-}N0_3$/kg under the tomato and this indicator was more on the tillage horizon than the under tillage layer. A variation coefficient under four versions was 12,01-34,39% by changing in the largest interval on the constant tillage.

An activity in the soils under a vegetable bean formed 50,9-80,4 on the tillage horizon and 40,7-62,0 mg N-$N0_3$/kg on the under tillage layer and three peaks were observed for an activity. An average mark of intensity under the constant vegetable bean was 23,3 units (37,50%) less than the crop rotation and an intensity changed by 28,7-46,5 mg N-$N0_3$/kg reducing along the profile on the tillage and under tillage horizons. An activity in the soils under the vegetable bean was higher than other growing vegetable plants. It is obvious that a mutual influence of the biotic (antropogen, plants, microorganisms) and a biotic factors (temperature, irrigation, humidity, an application of fertilizers, agrotechnics) makes a condition for increase of the nitrifixation bacteria under the vegetable bean and therefore for an activity intensity.

The mathematic calculations that an intensity in the grey-brown soils under the vegetable bean was 49,7-70,1 on the tillage layer, 47,5-58,3 on the under tillage layer, 40,8-44,6 and 32,0-36,9 mg N-$N0_3$/kg on the constant tillage, a variation coefficient changed 10,98-20,84%.

The nitrification process intensity in the irrigative grey-brown soils under the growing plants changed in the largest-interval depending on soil-ecological condition, plants biology. Three peaks for an activity under the white head cabbage+tomato, lucerne, vegetable bean, tomato, watermelon were noted in June, August and October, two peaks under a garlic, whitehead cabbage and potato were noted in June and October. The nitrifixing bacteria activity was higher under the versions of the lucerne, white head cabbage+tomato, vegetable bean than other versions and was higher on the crop rotation than the constant tillage.

Dynamics of the nitrification ability in the irrigative grey-meadow soils. As a result of ammoniac oxidization the nitrification process is formation of the nitrate oxidized combinations. Ensuring of the plants with nitrate and a need for nitrate fertilizers depend on nitrification process intensity. The nitrification process shows the soil cultivation level. A good condition for the high plants development, microorganisms activity as a result of energy in the soils which in nitrification process occurs intensively. The nitrification process intensity in the irrigative grey-brown soils was learnt by I. M. Abduyev (1987) and R. A. Agabayova (1984) and M. P. Babayev (1984) notes that irrigation influences on soils nitrification ability to an important degree and nitrate collection intensity increase in the high cultivated grey-meadow soils in the Shirvan zone. The nitrification process intensity in the grey-meadow soils at the research period changed by 7,4-16,3 on 0-25 cm 4-field vegetable-fodder crop rotation and 6,5-14,4 on 25-50 cm; 4,7-10,3 and 3,6-7,6 mg N-N03 kg on the constant tillage and three peaks for an activity were observed in June, August and October.

The splintering intensity of organic substances of the nitrification bacteria was higher under the two-year lucerne in comparison. An average mark of the intensity under an annual lucerne was 11,4-12,6 mg $N\text{-}N0_3$/kg under the two year lucerne in March-October. An intensity was enough higher on the low layers under the two-year lucerne, it is obvious, collecting of the organic mass under the lucerne to an important degree plays an additional energy source role for microorganisms activity. The statistic calculations show that the soils nitrification ability was 10,0-14,2 mg $N\text{-}N0_3$/kg, a variation coefficient changed by 14,99-19,29% in the soils under the lucerne. Three maximums for intensity under the lucerne were noted in July, August and October. Because of occurring of the nitrification process intensively under the cucumber planting after the lucerne the nitrate quantity collecting under it was much. The nitrification ability of soils under the cucumber changed by 8,0-12,9 mg $N\text{-}N0_3$/kg on 0-50 cm of layer at vegetation period, an average mark of the intensity formed 10,9 on 0-25 cm of layer; 9,2 mg N-N0_3/kg on 25-50 cm of layer, these indicators under the constant cucumber changed by 4,2-8,6; 4,7-9,6 and 3,6-7,5 mg N-N0_3/kg. Three maximums for an intensity in the soils under the cucumber were noted in June, August and October. The mathematic statistic analyses show that the nitrifixing bacteria activity in the soils under the cucumber was 10,9±0,658 on the tillage layer; 9,2±0,629 on the under tillage horizon, 6,7±0,990 and 5,4±0,519 mg N-N0_3/kg on the constant tillage and a variation coefficient on both version changed by 19,08-46,72%.

An intensity under the tomato changed by 74,4-12,8 on the tillage layer; 6,5-11,2 on the under tillage horizon 5,5-10,3 and 4,4-7,6 mg N-N0_3/kg on the constant tillage at the vegetation period. An average mark of intensity was 21,5 units more (27,7%) than the constant tomato. The statistic calculations show the nitrifixing bacteria activity changed by 7,7-10,9 in the soils under the tomato and 5,3-8,0 mg N-N0_3/kg on the constant tillage.

So, the obtained results show that 3 maximums for nitrifixing bacteria intensity under the growing plants were observed in June, August and October. It is obvious as a result of little humidity in the soil in August, because of being performed the nitrogen organic combinations decomposing function by nitrifixing bacteria a maximum was noted for an intensity in the soil at the same period. An increase of the nitrification process intensity under the plants in October is connected with the mineralization rate of the organic substance under the enough moisture and temperature in the soil at the same period. Collection of the nitrogen nitrate form on the upper layers occurs more intensively than the low layers.

Dynamics of the nitrification ability of the irrigative alluvial meadow-forest soils. The higher activity was observed in the irrigative alluvial meadow-forest soils under the lucerne in comparison and three peaks were noted in June, August and October. An activity under the two-year lucerne was higher than the version of the one-year lucerne+barley, it changed by 23,2-50,0 mg $N\text{-}N0_3$/kg on 0-50 cm of layer on both versions reducing by the profile (in March-October).

It is known from the mathematic analyses that the nitrifixing bacteria activity in the alluvial meadow-forest soils under the lucerne was 24,9-49,1 mg $N\text{-}N0_3$/kg, a variation coefficient was 18,-26,88%.

The nitrification process activity under an onion version formed 21,6-31,5 on the tillage layer and 15,2-22,1mg $N\text{-}N0_3$/kg by reducing on the under tillage horizon at the vegetation period, two peaks for an activity were observed in June, October. An average mark of the constant onion tillage was 6,0 units less than the crop rotation and changed by 10,8-16,4 on the tillage layer and 9,8 12,6 mg $N\text{-}N0_3$/kg on the under tillage layer. The statistic calculations show that the nitrification ability of the soils under an onion was 25,6±1,340 on the tillage layer; 18,5±0,827 on the under tillage horizon; 13,0±0,787 and 10,5±0,578 on the constant tillage. A variation coefficient was 18,01-24,36% by changing in the largest interval under the constant onion.

An activity under the cucumber version formed 13,2-25,3 mg $N\text{-}N0_3$/kg on 0-50 cm of layer decreasing along the profile at the rotation period, three peaks for an intensity were observed in June, August and October. An average mark of the nitrification process intensity under the cucumber was 20,5 on the tillage layer and 16,0 on the under tillage horizon at the end of the vegetation. An average value of intensity on the constant cucumber reduced 26,2% in comparison with the crop rotation and changed by 8,9-22,2 mg $N\text{-}N0_3$/kg on the under tillage layers. The statistic calculations show that the nitrification ability in the soils under the cucumber formed 15,0-21,8 on 0-50 cm of layer on the crop rotation, 10,8-17,3 mg N-$N0_3$/kg on the constant tillage, a variation coefficient was 23,64-31,01%.

An activity under the whitehead cabbage was 23,2-40,0 on the tillage layer and 15,0-28,6 mg N-$N0_3$/kg on the under tillage layer decreasing along the profile and two peaks for the nitrifixing bacteria activity were observed in June and October. The nitrifixing bacteria activity under the constant whitehead cabbage changed by 11,3-23,2 mg N-$N0_3$/kg on 0-50 cm of layer reducing along the profile. The mathematic calculations show that the nitrifixing bacteria activity in the alluvial meadow-forest soils under the whitehead cabbage was higher on the crop rotation than the constant tillage, on the under tillage than under tillage layer and this indicator formed 19,5-31,8 mg N-$N0_3$/kg on 0-50 cm of layer on the crop rotation.

An activity under the green fodder+tomato version was higher than the under tillage layer and changed by 21,5-29,9 mg N-$N0_3$/kg on 0-50 cm of layer and three peaks for an activity were observed in June, August and October. The mathematic analyses show that the soils nitrification ability formed 30,4±1,710 on the tillage horizon, 22,8±1,356 mg N-NO3/kg on the under tillage layer under green fodder+tomato version and an intensity was higher than the constant tomato tillage. A variation coefficient changed in the largest interval on the constant tomato tillage in comparison with the crop rotation.

The higher intensity of the nitrification process in the irrigative alluvial meadow-forest soils was observed lucerne, but the least one was observed under the cucumber, the rest plants take an interval stand. Three peaks under the versions of lucerne, cucumber, green fodder+tomato for an intensity of the nitrification process under the plants were noted in June, August and October, two peaks under onion, whitehead cabbage versions were noted in June and

October. An intensity under the growing plants was higher on the tillage layer than the under tillage layer, on the crop rotation than the constant tillage. Being higher of the nitrification process intensity under the vegetable plants in October, it is obvious that is connected with the mineralization rate of the plant residues under the optimum and humidity regime condition after crop harvesting.

Dynamics of the nitrification ability of the irrigative gleyey-yellow soils. The nitrification process intensity in the irrigative gleyey-yellow soils under the vegetable plants was learnt in the dynamics under the growing plants in March-October. An activity under the tomato on the 5-field vegetable-leguminous crop rotation changed by 20,7-32,4 on 0-25 cm of layer and 13,2-22,5 mg $N\text{-}N0_3$/kg on 25-50 cm of layer, a higher activity was observed in June. Three peaks for an activity of the nitrification process under the tomato were noted in June, August and October. An average mark of the activity on the constant tomato tillage was 7,6 units less (33,3%) than the tomato planted on the crop rotation, an intensity changed by 8,7-2,33 mg $N\text{-}N0_3$/kg reducing along the profile. The mathematic calculations show that an activity was higher than the constant tomato version changing by 27,4+1,424 on the tillage layer; 18,1±1,207 mg $N\text{-}N0_3$/kg on the tillage layer under the tomato. A variation coefficient on the crop rotation was less than the constant tomato version by changing by 18,75-24,10% on 0-50 cm of layer.

An activity under white head cabbage+maize version formed 16,0-30,8 on the tillage horizon and 14,2-22,8 mg $N\text{-}N0_3$/kg on the under tillage layer at the vegetation period, the higher activity was in June. Three peaks for an intensity of nitrification process were noted in June, August and October. An activity on the constant whitehead cabbage tillage was 12,1-18,6 on the tillage layer, 8,1-14,4 $N\text{-}N0_3$/kg on the under tillage horizon decreasing along the profile, the higher activity was observed in June and two peaks for an activity were noted. An intensity under the constant maize was 10,3-18,5 on the tillage layer, 7,6-11,7 mg N-N0_3/kg on the under tillage horizon at the vegetation period. The mathematic analyses show that the soils nitrification ability varied on the tillage layer 25,1±1,634 under the white head cabbage+maize version; 18,0±1,349 on the under tillage layer; 15,3±1,463; 11,3±1,100 under the whitehead cabbage on the constant tillage; 13,7+1,225 and 9,8+0,557mg N-03kg under the maize, a variation coefficient changed by 21,22-35,21%.

An intensity in the soils under the onion was 13,1-21,2 mg N-N0_3/kg on 0-50 cm of layer reducing along the profile and was characterized by little intensity of the nitrification process and two peaks-June and October in the research years. An average mark of the intensity on the constant onion tillage was 7,3 units (42,2%) than the crop rotation and changed by 9,2-14,5 on the tillage layer and 6,9-11,1 mg N-NO_3/kg on the under tillage layer. The mathematic analyses carried out for learning of the nitrification process intensity under the onion show changing of the activity by 13,5-21,5 on 0-50 cm of layer on the crop rotation 8,0-12,2 mg N-N0_3/kg on the constant tillage. A variation coefficient changed in the largest interval on the constant tillage than the crop rotation.

The nitrate accumulation intensity in the gleyey-yellow soils under the vegetable bean varied by 20,2-39,9 on the tillage horizon and 14,5-27,8 mg N-N0_3/kg on the under tillage horizon and three peaks for an activity were noted. An average value of the activity under the constant vegetable bean was 8,3 units less than the crop rotation, and varied by 11,8-24,0 mg N-N0_3/kg on 0-50 cm reducing along the profile. The mathematic analyses show the change of the nitrification process under the vegetable bean depending on development phase and formation of this indicator 17,2-33,3 on 0-50 cm of layer on crop rotation and 11,6-20,2 mg N-N0_3/kg on the constant tillage. A variation coefficient vibrated by 18,54-20,70% on the crop rotation, 29,25-34,57% on the constant tillage under the vegetable bean.

The highest activity of the soils nitrification ability was noted under the vegetable bean and the least one under the onion, but it took an interval stand under maize, tomato, whitehead cabbage. Three peaks under the version of the cabbage were observed in June, August and October, two peaks under the constant maize version were observed in June and October. The nitrification process intensity under the plants where the vegetation is continuing was enough higher in comparison despite the temperature was higher in August. A value of this indicator during the season differed from each other depending on the plants biology and development phase. A comparison of the soils for a nitrification ability under the irrigation condition shows that mineralization activity of nitrogen organic combinations was higher in the irrigative grey-brown soils than grey-meadow, alluvial meadow-forest and gleyey-yellow soils. It is obvious that the environment acidity, anaerobe condition, gleyey in the irrigative gleyey-yellow soils, salinity in the irrigative grey-meadow soils limited the nitrifixing bacteria activity.

5.2 Ammonifixing Ability of the Irrigative Soils

One of the main stages in the nitrogen organic combinations overturn is an overturn, that is ammonification of amin-acids, nitrogen bases, hexozamins and other amids. At this time ammoniac is formed as a result of dezamining under an influence of hydrolytic and oxidizing-reducioning ferment being secreted by different ammonofixing microorganisms. Ureaza has been learnt better than hydrolytic dezaminases (amidases) in the soil. Biochemical ammonification spreaded widely in the soil it is fulfilled by some ferments coordinated to hydralases, oxyreductases and lyases being secreted by the microorganisms corresponded to the different soil-ecological condition. Ammonification of nitrogen organic combinations depends on nature of organic matters, nitrogen in its structure, soil types and characters (Paulson and et. al., 1970).

There is a great importance of the nitrogen organic combinations ammonification in plants feeding, productivity increase in agriculture. The plants assimilate mineral nitrogen in a form of ammoniac salts depending on soil-ecological condition (soil type, temperature humidity and etc.) or in a form of nitrate salts after the got ammoniac subjected to the following overturns. Ammoniac is got by a participation of the hydrolytic ferments being secreted by ammonifixing bacteria.

The urine essence chitin, hypur acid, humid substances, albumen matters and other different structural nitrogen organic combinations are subjected to ammoniacation process, at this time one part of the decomposing ammoniac is observed in the soil, the definite part is turned into nitrites and nitrates or returns into the atmosphere in a free form by means of autotrophs (Gasimova, 1985). One of the other chains in the ammonification process is albumens ammonification. Albumen is mainly entered the soil by the plant and animal residues, peptones, peptides and amin-acids are formed in their hydrolyze. Microorganisms use of the simple albumens forming in decomposition of the albumen substances as a food and energy source. The radiant fungi, microscopic fungi in accordance with *Pencillium, Aspergillus, Mucor, Trichorrerma, Alternania, Fusarium* and other sorts participate in decomposition of the albumen substances. The soil humus ammoniacation is fulfilled by microorganisms. The decomposing products are distinguished as the different soil types are compared by quality and quantity for humus. When nitrogen combinations are shortage in the environment, dehumification occurs, some nitrogen combinations fall into the form of which the plants can assimilate.

Dynamics of the ammonification ability in the irrigative grey brown soils. The researches show that the ammonification process activity possesses a seasonal character changing in a large interval depending on soil type. An intensity under the annual lucerne+barley changed by 17,8-31,5 on the tillage layer; 12,1-18,1 on the under tillage horizon; it changed by 19,5-34,9 and 15,0-23,1 mg N-NH_3/kg under the two-year lucerne in March-October of the research years. Three peaks for an activity of the ammonification process under the lucerne were noted, the higher activity was in October. In comparison the two-year lucerne differed from other growing plants by the most intensive proceeding of the ammonification process. The mathematic analyses show that an activity of ammonifixing bacteria under an annual lucerne+barley and two-year lucerne was 19,7-24,9 on the tillage layer, 14,5-17,5 mg N-NH_3/kg on the under tillage layer and a variation coefficient was 16,51-26,84%.

The ammonification process intensity under the watermelon on the 1st scheme was 14,7-26,9 on the tillage layer; 11,5-21,8 on the under tillage horizon decreasing along the profile; it formed 16,2-24,2 and 10,8-17,5 mg N-NH_3/kg on the 2nd scheme, three peaks were noted in March, July and October. The ammonification process intensity on the watermelon constant tillage was 10,5-18,8 on 0-50 cm of layer decreasing along profile. Planting of the watermelon in the same place for 6 years was a reason for weakening of the biological activity and ammonification process intensity, therefore an average value of the intensity was 5,1 (25,6%) less than the watermelon on the 1st scheme, 2,3 units (13,5%) less than the 2nd scheme. The mathematic analyses show that grey-brown soils changed by 22,1±1,301 on the tillage layer; 17,2±1,073 on the under tillage horizon on the 1st scheme; 19,8±0,955;

14,2±0,777; on the 2nd scheme: 16,2±1,150 and 13,3±0,889 mg N-NH_3/kg on the constant tillage, a variation coefficient changed by 17,38-28,66%.

An activity changed by 11,2-22,6 on 0-50 cm of layer under the potato on the 1st scheme; 9,4-21,0 mg N-NH_3/kg on the 2^{nd} scheme, three maximums for an intensity were noted in March, June and October. An average value of the intensity in the soils under the constant potato was 37,6% less than the crop rotation, an activity formed 8,2-16,4 on the tillage layer (0-25 cm); 5,3-14,3 mg N-NH_3/kg on the under tillage (25-50 cm). The mathematic calculations show that the ammonification process occur very intensive in comparison with the constant potato tillage, a variation coefficient changed in the largest interval on the constant tillage.

The ammonifixing bacteria activity in the soils under the garlic changed by 13,6-23,4 on the tillage layer, 7,5-16,6 mg N-NH_3/kg on the under tillage horizon and three peaks for an intensity were observed in March, July and October. An intensity on the constant garlic tillage was 7,0-13,4 mg N-NH_3/kg on 0-50 cm of layer decreasing along the profile. The statistic calculations show that an activity in the soils under the garlic formed 18,1±1,072 on the tillage layer and 12,4±0,885 on the under tillage layer on the 1^{st} scheme, 11,0±0,846 and 8,7±0,566 mg N-NH_3/kg on the constant tillage and the variation coefficient changed by 23,81-30,89%.

An intensity under the version of the white head cabbage+tomato was 17,4-29,2 on the tillage layer and 13,5-20,1 mg N-NH_3/kg decreasing along the profile in the research years, three peaks for an activity were noted in March, July and October. An intensity on the tillage layer under the tomato changed by 15,3-23,5 and 12,5-20,3 mg N-NH_3/kg on the under tillage horizon. A change interval of the, ammonification process intensity along the profile was 7,4-18,8 mg N-NH_3/kg on the constant tomato tillage. An intensity under the constant whitehead cabbage changed by 15,1-22,1 on the tillage layer and 8,9-17,0 mg N-NH_3/kg on the under tillage horizon, two peaks for an activity were noted in March and October. An average value of the activity in the soils under the constant tomato was 7,3 (37,2%) less than white head cabbage+tomato on the 1^{st} scheme; 5,7 units (31,7%) less than the tomato version on the 2^{nd} scheme. The statistic calculations show that an activity formed 22,8±1,043 on the tillage layer under the version of the white head cabbage+tomato; 16,0±0,736 on the under tillage layer;14,8±1,039 and 16,3±0,989 mg N-NH_3/kg under the tomato version of the 2^{nd} scheme and was higher than constant tillage, a variation coefficient changed in the largest interval on the constant tillage.

An intensity under both version under the vegetable bean at the vegetation period changed by 17,2-2,93 on the tillage layer; 12,8-22,6 mg N-NH_3/kg on the under tillage horizon, three peaks for an activity were noted in March, July and October. An average mark of the ammonofication process intensity under the constant vegetable bean was 3,3 units (16,3%) less than the crop rotation; 10,8-23,3 on the tillage layer AI^I_a; 13,1-18,3 mg N-NH_3/kg on the under tillage horizon. The analyses for an activity of ammonifixing bacteria under the vegetable bean version show that this indicator was higher on the crop rotation than the constant tillage, the variation coefficient was contrary to it. The lucerne form the growing plants for ammonification process intensity was higher, the garlic was distinguished by its activity in the irrigative grey-brown soils, three peaks for an activity were observed in March, July and October, the maximum activity was noted in March or October depending on plants biology.

Dynamics of the ammonification ability in the irrigative grey-meadow soils. The ammonification process intensity vibrated 9,5-33,8 on the tillage layer and 7,1-33,8 mg N-NH_3/kg on the crop rotation and constant tillage in the irrigative grey-meadow soils. The more favourable condition for an activity of microorganisms participating in overturning of nitrogen organic combinations among the research microorganisms formed under the two year lucerne. The ammoniac quantity decomposing in the ammonification process was much on the soil layers under the two-year lucerne, it changed by 31,0-61,6 mg N-NH_3/kg on 0-50 cm of layer. It can be explained by that the organic combinations which are additional materials are collected more intensively foe microorganisms activity in the soil under the two-year lucerne. An average value of the intensity under the two-year lucerne was higher in comparison; 6,4 units (14,19 %) than the annual lucerne; 9,9 units (21,95%) than the cucumber, 12,6 units (27,94%) more than the tomato in the irrigative grey-meadow soils. An intensity under the cucumber on the crop rotation was 16,7 units (47,44%) was higher than the constant tomato under the tomato. The statistic analyses show that an ammonification ability of the irrigative grey-meadow soils under an annual lucerne version changed by 31,7-45,8 on 0-50 cm of layer, 37,4-52,9 under the two-year Lucerne; 28,3-43,1 under the cucumber, 25,5-40,2 under the tomato, 16,8-29,8 under the constant tomato; 14,2-24,0 mg N-NH_3/kg under the cucumber, a variation coefficient changed by 21,98-26,29% on the crop rotation and 22,52-32,55% on the constant tillage.

So, the consequences of the carried research works show that the ammonification ability of the irrigative grey-meadow soils changed in a large interval on the crop rotation depending on the plants development phase. Three maximums for an intensity of the ammonification ability were noted in March, July and October in the irrigative grey-meadow soils under the growing plants. The collection intensity of the nitrogen ammoniac form was less on the constant tillage than the crop rotation.

Dynamics of the ammonification ability in the irrigative alluvial meadow-forest soils. Changing of the ammonifixing bacteria activity is dynamically characterized depending on soil-ecological condition biotically (human activity, plants, microorganisms and etc) and abiotically (humidity, temperature, nutrient and etc) in the irrigative alluvial meadow-forest soils during a season. The lucerne in the same soil type under the plants growing on the vegetable-fodder crop rotation is distinguished by being higher of the ammonifixing bacteria activity in comparison. An intensity under the annual lucerne+barley changed by 19,5-55,2 on the tillage and under tillage layers; 25,8-62,2 mg N-NH_3/kg under the two-year lucerne. Three peaks for intensity under an annual lucerne+barley and two-year lucerne were noted in March, July and October and the least activity was observed in August. An average value of the activity under the two-year lucerne was 8,8 units (22,6%) more than an annual lucerne+barley version. The statistic calculations show a change of the intensity under the lucerne by 22,9-45,4 mg N-NH_3/kg, of the variation coefficient by 21,75-30,01%. A change amplitude of the ammonifixing bacteria activity under the onion was 25,7-48,7 on the tillage layer AI^{I}_{a}; 21,1-37,4 N-NH_3/kg on the under tillage AI^{II}_{a} at the vegetation period (in March-October). The lucerne was a reason for keeping of the activity in a higher level as a predecessor in the soils under the onion, three peaks for an activity were observed in March, July and October. An activity on the constant onion tillage was 12,1units (37.8%) than crop rotation, changed by 13,2-27,2 mg N-NH_3/kg on the tillage and under tillage horizons. The mathematic analyses show that the intensity in the soils under the onion was 36,6±2,149 on the tillage and 27,5±1,776 on the under tillage horizon, 20,8±1,605 and 19,1±1,353 mg N-NH_3/kg on the constant tillage a variation coefficient under both version changed by 23,65-31,14%.

An intensity in the soils under the cucumber changed by 17,9-37,8 on the layer and 15,8-22,7 mg N-NH_3/kg on the under tillage layer at the vegetation period. An activity under the cucumber on the constant tillage was 4,5 units less (19,6%) than the cucumber version a change amplitude of intensity was 11,0-31,6 mg N-NH_3/kg on 0-50 cm of layer by decreasing along profile in March-October months, three peaks were noted in March, July and October. The statistic analyses show that the ammonifixing bacteria activity changed by 27,4±1,846 on the tillage layer, 18,4±0,836 N-NH_3 mg/kg on the under tillage layer on the crop rotation, a variation coefficient changed by 18,34-27,44% by decreasing along the profile. The ammonification process intensity under the white head cabbage changed by 15,6-43,2 on the tillage layer, 12,3-36,7 mg N-NH_3/kg on the under tillage layer in the research years, three peaks for an intensity were noted in in March, July and October. A minimum value of the activity was noted in September, the maximum one was noted in March. It is obvious a presence of the plant in the area at the same period, the development phase conditioned ammonifixing bacteria activity. The bacteria activity fulfilling the ammonification process under the constant white head cabbage reduced and changed by 15,4-35,3 on the tillage layer and 10,9-29,2 mg N-NH_3/kg on the under tillage layer, three peaks for an activity were noted in in March, July and October and the higher activity was noted in March, the minimum one in September. The soils analysis under the white head cabbage shows that an activity changed by 19,8-32,6 on the tillage and under tillage layers on the crop rotation and 15,8-27,2 mg N-NH_3/kg on the constant tillage, a variation coefficient changed by 30,75-41,36%. Intensity under a version of the green fodder+tomato, minimum activity was noted in September. The higher activity at the vegetation period was observed in March (50,3 mg N-NH_3/kg) and the lowest one in August (29,3 mg N-NH_3/kg), three peaks for an activity were noted in March, July and October. An average value under the constant tomato decreased 12,8 units (35,3%) in comparison with the crop rotation, changed by 3,4-32,2 mg N-NH_3/kg on the tillage and under tillage layers a maximum activity was noted in March, the minimum one in September. The statistic analyses show that ammonifixing bacteria activity was more on the crop rotation than the constant tillage, a variation coefficient changed in the largest interval on the constant tillage. A more intensity of the ammonification process was noted in the irrigative alluvial meadow-forest soils, the less one was noted under the constant onion, three peaks for an activity were noted in March, July and October, and the less activity was in August.

Dynamics of the ammonification ability in the irrigative gleyey-yellow soils. The ammonification process intensity under the tomato on the 5-field vegetable-leguminous crop rotation changed by 97,7-125,1 on the tillage layer AI^I_a and 80,0-120,9 mg N-NH_3/kg on the under tillage layer AII^I_a, the higher activity was observed in March, the least one in August, three peaks were in March, July and October. An intensity on the constant tomato tillage was 10,1units less on the under tillage layer than the tillage horizon, 74,5-12,28 mg N-NH_3/kg on 0-50 cm of layer decreasing along the profile. The analysis of the gleyey-yellow soils for the ammonifixing bacteria activity shows that this indicator under a version of the tomato was 112,6±3,519 on the tillage layer, 101,6±4,390 on the under tillage layer; 103,5±4,980 on the constant tillage and 93,2±4,964 mg N-NH_3/kg and a variation coefficient changed in the largest interval on the constant tillage.

The ammonification process intensity under a version of the white head cabbage+maize was 106,7-132,1 on the tillage layer, 97,2-121,5 mg N-NH_3/kg on the under tillage horizon, three peaks for an activity were noted in March, July and October in the research years. The ammonification process intensity under the white head cabbage on the constant tillage changed by 80,5-124,7 on the tillage layer; 72,4-114,0 on the under tillage horizon, 78,4-112,7 and

66,9-90,6 mg N-NH_3/kg under the maize at the research period. Three peaks for an activity under the white head cabbage on the constant tillage were noted in March, July and October, two peaks under the maize version were noted in March and October, the less activity was in August. An average quantity of the intensity under the white head cabbage+maize version was 14,3 units (11,8%) more than the constant white head cabbage; but 30,6 units more than the constant maize. The mathematic analyses show that an intensity vibrated by 107,7-122,5 on 0-50 cm under the white head cabbage+maize version; 92,2-109,8 under the white head cabbage on the constant tillage; 76,4-93,3 mg N-NH_3/kg under the maize and a variation coefficient under each three versions vibrated 8,44-17,52%.

A change interval of the intensity in the soils under the onion was 90,9-118,9 on the tillage horizon and 77,5-102,0 on the under tillage layer, an activity on the constant tillage reduced along the profile and changed by 76,1-105,6 mg N-NH_3/kg on 0-50 cm of layer. An analysis of the soils under an onion for an intensity of the ammonifixing bacteria shows that an activity was 105,3±2,885 on the tillage layer on the crop rotation, 89,0±2,628 mg N-NH_3/kg on the under tillage horizon by changing in the largest interval on the constant tillage.

The ammonification ability of the gleyey-yellow soils under the vegetable bean changed by 102,3-141,4 on the tillage layer (AI^{I}_{a}) and 81,4-123,1 mg N-NH_3/kg on the under tillage horizon (AI^{II}_{a}) at the vegetation period. An activity under the constant vegetable bean was 78,5-132,3 mg N-NH_3/kg on the under tillage and tillage layers and three peaks for an activity were observed in March, July and October. The mathematic analyses show that an activity was higher on the tillage and under tillage layers under the vegetable bean than the constant tillage, a variation coefficient changed by 85,9-15,33%. The higher activity was in the gleyey-yellow soils under the growing plants on the crop rotation under the vegetable bean the less was under the onion. Three peaks for an activity under the versions of the vegetable bean, white head cabbage+maize, tomato were observed in March, August and September, the two peaks under the constant maize were observed in March and October.

A comparison of the research irrigative soil types show that a higher activity of the ammonification process was observed in the gleyey-yellow soils.

5.3 An Intensity of the Carbon Dioxide Gas Decomposing from the Soil

Entering of carbon dioxide the soil by the plant under soil organs and because of the least information about the following transformation its learning creates difficulties on methodic side. The root secretion and plant residues become shattered till carbon dioxide gas easily by microorganisms, it decomposed from the soil with the carbon dioxide gas during the respiration of the plant roots and humus substances shattering. Decomposition of carbon dioxide gas from the soil by the different methods and fast creates complication in definition of the carbon circulation components in the atmosphere-plant-soil system. Use of the soils under the agricultural plants increases 20-25% of the decomposing intensity of carbon dioxide gas; this is explained by an increase of aeration. It is necessary to notice a quantity of ammonifixing and amilolithic bacteria, fungus, CO_2, catalase ferment activity, humus quantity in order to define an integral indicator of the biological activity (Kazeyev and et al., 2002). Dependence of decomposing intensity of carbon dioxide gas from the soil on temperature, plants development phase, using under the agricultural plants, application of the crop rotation reflected in some authors works. Depending on the plant sort forms 6-80% plant roots of the carbon emission from the soil in agrosenoz (Bowden and et al., 1993) and this indicator changes depending on a temperature (Beleusov and et al., 2005; Kuzyakov, 2001; Bauma and et al., 1997; Singh and et al., 1977), humidity (Bauma and et al., 1997; Singh and et al., 1977), plant development phase (Bowden and et al., 1993), hydrothermic regime (Lopes De Gerenyu and et al., 2004) soil type, using degree of the soils, cultivation level applying agrotechnics (Babayev, 1994; Orudzheva, 2009; Shakuri, 2004), soil fertility (Babayev, 1994; Orudzheva, 2009) and their ensuring degree with the nutrient. B.N. Makarov (1977) shows an importance of the carbon dioxide gas in soil air, presence of a main indicator of the biological activity. G. A. Buyanovsky (1972) shows decomposition of carbon dioxide gas from soil in a high quantity in the Kur-Araz lowland in the middle of summer, presence of the negative relation of the indicator with the humidity, a positive correlative relation with the temperature. Some works have been dedicated to the study of the carbon dioxide gas filthiness decomposing from the soils under different plants (Hasanov Y., 1999; Babayev and et al., 2009; Orudzheva, 2009; Makarov, 1977). A root respiration of the annual and long-term agricultural plants has been learnt well (Bauma and et al.,1997; Singh and et al., 1977) CO_2 emission in natural senoz forms 53-83% of the annual norm at the vegetation period; 58-78% in agrosenoz (Zavarzin, 1994). As a result of izotops application it was defined with the experiments that assimilated carbon dioxide decomposes for not only plant roots building but also in a form of carbon dioxide gas during the plant roots respiration and it is secreted to rizospher to an important degree in a form of the little and high molecular combinations (14-15%) of the assimilated carbon dioxide (Kuzyakov, 2001). Carbon dioxide gas is more, but oxygen gas is less than the atmosphere air in a soil air, this is connected with the weak aerasion and intensive biological activity, therefore the carbon dioxide gas density is a characteristic indicator of the biological activity in soil air. The carbon dioxide gas balance is exposed to a daily, seasonal and annual change (Kurqanov and et al., 2004). The soil “respiration” is one of the global biogeochemical carbon dioxide and oxygen circulation chains and decomposes into the following categories biological, biochemical, soil-physical and geological, carbon dioxide gas exchange is one of the strong factors influencing on soil forming process (Lubnina and et al., 2004).

Dynamics of the carbon dioxide gas intensity decomposing from the irrigative grey-brown soils. The soil "respiration" is an actual activity of the soil; it is learnt under a field condition. As a result of the plant roots respiration, the microorganisms activity in the irrigative grey-brown soils the decomposing carbon dioxide gas intensity under an annual lucerne+ barley changed by 2,86-3,86 and 3,18-4,16 kg of CO_2 /ha per h under the two-year lucerne, two maximums for an intensity were observed in June and October. An average quantity of the carbon dioxide gas decomposing from the soils under the two-year lucerne was 1,05 units (27,6%) more than the annual lucerne+barley. The higher intensity of the carbon dioxide gas decomposition from the soil in comparison was noted under the lucerne. It is obvious that the strong root system raises the microorganisms activity together with accelerating of the root respiration, therefore the carbon gas intensity which is formed in the soil biota and root system respiration increases. An analyses of the soils under lucerne for the decomposition intensity of the carbon dioxide gas shows that this indicator was 3,44±0,092 under the lucerne+barley, 3,79±0,092 kg of CO_2 /ha per h under the two-year lucerne.

A quantity of CO_2 decomposing from the area where a watermelon possesses changed by 3,05-3,94 on the 1^{st} scheme; 2,38-3,08 kg of CO_2 /ha per h on the 2^{nd} scheme, two maximums for an intensity were in July and October. An intensity of CO_2 decomposing in the soil '`respiration`` in the constant watermelon tillage formed 2,38-3,08 kg of CO_2 /ha per h and an average value of the intensity was

0,87 units less than the watermelon on the 1^{st} scheme; 0,65 units, less than 2^{st} scheme.

An analyses of the soils under watermelon for an intensity shows that a quantity of carbon dioxide gas decomposing from the soil was 3,51±0,083 on the 1^{st} scheme, 3,32±0,088 on the 2^{nd} scheme and 2,66±0,106 kg of CO_2/ha per h on the constant tillage. A variation coefficient changed by 9,52-15,99% under each three versions.

An intensity under the potato on the 1^{st} scheme was 2,71-3,58 and 2,59-3,52 kg of CO_2/ha per h on the 2^{nd} scheme at the vegetation period. Two maximums for a decomposing intensity of carbon dioxide gas under the potato were in June and October. A decomposing intensity of $C0_2$ from soil in the constant potato tillage was 2,27-3,08 kg of CO_2/ha per h at the vegetation period. An intensity of CO_2 decomposing in the soil ``respiration`` under the potato on the 1^{st} scheme was 3,09±0,083 and 2,92±0,094 on the 2^{nd} scheme; 2,68±0,0106 kg of CO_2 /ha per h on the constant tillage, a variation coefficient changed by 10,78-15,90% under every three versions. A quantity of $C0_2$ decomposing in the ``respiration`` of the under garlic soils changed by 2,53-3,23 kg of CO_2/ha per h at the vegetation period, two maximums for an intensity were noted in June and October. An average value of the intensity in the constant garlic tillage was 0,35 units than the crop rotation and changed by 2,27-2,98 kg of CO_2/ha per h at the vegetation period. A mathematic analysis of the under garlic soils shows that an intensity was higher on the crop rotation than the constant tillage and 2,82±0,068 kg of CO_2/ha per h, a variation coefficient was 9,69%.

An intensity under the white head cabbage+tomato version changed by 2,93-3,84 kg of CO_2/ha per h (in March-October) at the research period, two maximums for an intensity were observed in June and October. A change interval of the intensity under the tomato was 2,78-3,41 kg of CO_2/ha per h in the research years, two maximums were noted in July and October. An intensity under the tomato on the constant tillage changed by 2,46-3,08 at the vegetation period; 2,43-3,29 kg of CO_2/ha per h in white head cabbage, two maximums for an intensity were in June and October. The mathematic analyses show that decomposing intensity of $C0_2$ from the soil surface was 3,52±0,084 under the white head cabbage+tomato on the 1st scheme; 3,15±0,133 kg of CO_2/ha per h under the tomato on the 2nd scheme, this indicator was little on the tomato tillage. A variation coefficient changed by 9,59-15,18% under the white head cabbage+tomato on the 1st scheme and under the tomato versions on the 2nd scheme; 17,00-17,91% under the white head cabbage and tomato on the constant tillage. A average value of the $C0_2$ quantity which decomposes in the soil ``respiration`` under the vegetable bean was 3,61 on the crop rotation; 3,01 kg of CO_2/ha per h on the constant tillage. The mathematic statistic analyses show that a decomposing intensity of CO_2 from soil under the vegetable bean formed 3,61±0,098 and 3,01±0,175 kg of CO_2/ha per h on the constant tillage, a variation coefficient was 9,83-20,98%. The researches show that $C0_2$ intensity decomposing from soil changes in dynamics depending on development phase, biology and soil-ecological condition of the plants growing in the irrigative grey-brown soils. Two maximums under the plants growing for an intensity were observed in June, October or July, October. The higher quantity of CO_2 decomposing from soil was observed under the lucerne, the least one was observed under the garlic. The plants can be formed up in the following sequences for decomposing intensity of $C0_2$ from soil: Lucerne > vegetable bean > white head cabbage > tomato > watermelon > potato > garlic.

Dynamics of the carbon dioxide gas intensity decomposing from the irrigative grey-meadow soils. CO_2 intensity decomposing from the irrigative grey-meadow soils was learnt by G. A. Buyanovsky (1972), N.H. Orudzheva (2009) and others. CO_2 quantity decomposing from the irrigative grey-meadow soils under the plants growing applying 4-field vegetable-fodder crop rotation was 1,52-2,96; 1,11-2,62 kg of CO_2 /ha per h on the constant tillage. The decomposing intensity of $C0_2$ from the soil under an annual lucerne vibrated by 1,55-2,48; 1,68-2,96 kg of CO_2 /ha per h under the two-year lucerne. Two maximums for an intensity under the lucerne were observed in July and October.

$C0_2$ quantity decomposing from the two-year lucerne was 0,30 units (12,45%) more than an annual lucerne. $C0_2$ quantity under the cucumber was 1,65-2,89 kg of CO_2 /ha per h on the crop rotation and two maximums were noted. An activity formed 2,89 kg of CO_2 /ha per h on the crop rotation and two maximums were noted. An activity formed 2,89 in June and 2,68 kg of CO_2 /ha per h in October. An influence of the lucerne as predecessor was a reason for keeping of the intensity in a high level under the cucumber.

An intensity under the tomato changed by 1,52-2,79, an intensity under the constant tomato changed by 1,32-2,62 kg of CO_2 /ha per h and was 0,24 units (10,57%) less on the crop rotation the tomato, 0,49 units (20,94 %) less on the crop rotation than the cucumber changing by 1,11-2,42 kg of CO_2 /ha per h under the constant cucumber. The mathematic statistic calculations show that an intensity changed by 2,11-2,58 on the crop rotation, 1,68-2,20 kg of CO_2 /ha per h on the constant tillage, a variation coefficient was 18,83-29,69%.

So, two or three maximums for decomposing intensity of $C0_2$ under the plants in the irrigative grey-meadow soils were observed in June, August or July, August and October.

Dynamics of the carbon dioxide gas intensity decomposing from the irrigative alluvial meadow-forest soils. An intensity under an annual lucerne+barley in the irrigative alluvial meadow forest soils was 2,57-3,90 and 3,65-4,50 kg of CO_2/ha per h under the two-year lucerne, two maximums for an intensity were observed in June and October. The higher intensity under an annual lucerne+barley was noted in June (3,90 kg of CO_2/ha per h) and under the two year lucerne in October (4,50 kg of CO_2/ha per h). A quantity of $C0_2$ decomposing from the soil surface under the two-year lucerne was 0,92 units (22,4%) than an annual lucerne+barley. A mathematic analysis of $C0_2$ quantity decomposing from the soils under lucerne shows that an intensity was 3,18±0,410 under the annual lucerne+barley; 4,11±0,117 kg of CO_2/ha per h was under the two-year lucerne.

An intensity changed by 2,87-4,04 kg of CO_2/ha per h under an onion and two maximums for $C0_2$ intensity were observed in June (4,04 kg of CO_2/ha per h) and October (3,01 kg of CO_2/ha per h) in the research years. An intensity in the constant onion tillage was 2,06-3,10 kg of CO_2/ha per h and an average quantity of the intensity was 0,85 units (25,0%) less than the crop rotation at the vegetation period. A mathematic analysis of the soils under the onion shows that decomposing intensity of $C0_2$ changed by 3,43±0,121 on the crop rotation, 2,95±0,126 kg of CO_2/ha per h on the constant tillage and a variation coefficient changed by 14,19-17,16%.

A change amplitude of the intensity under a cucumber was 2,39-3,60 kg of CO_2/ha per h two maximums for an intensity were in July (3,60 kg of CO_2/ha per h) and October (2,78 kg of CO_2/ha per h) at the vegetation period. An intensity on the constant cucumber tillage changed by 2,28-3,21 kg of CO_2/ha per h on 0-50 cm of layer. The mathematic analyses show that an intensity of CO_2 decomposing in soil "respiration" was 2,83±0,135 under the cucumber; on the crop rotation; 2,65±0,137 kg of CO_2 /ha per h on the constant tillage, a variation coefficient changed in the largest interval on the constant tillage.

An intensity in the soils under the white head cabbage was changed by 2,75-3,54 kg of CO_2 /ha per h in March-October and two maximums for an intensity were noted in June and October. An intensity under the constant white head cabbage was 2,60-3,33 kg of CO_2 /ha per h in March-October. The mathematic calculations show that CO_2 intensity in the soils under the white head cabbage was 3,18±0,082 on crop rotation and 2,94±0,106 kg of CO_2 /ha per h on the constant tillage, a variation coefficient changed in the largest interval. The CO_2 quantity decomposing from the soil under green fodder+tomato version at the vegetation period changed by 3,18-4,21 kg of CO_2 /ha per h and two maximums were noted. An intensity under the constant tomato changed by 2,71-3,42 kg of CO_2 /ha per h in the research years. The mathematic analyses show that an intensity of the decomposition of $C0_2$ from soil was 3,66±0,118 kg of CO_2 /ha per h under green fodder+tomato version; 3,08±0,105 kg of CO_2 /ha per h under constant tomato. A change interval of the intensity on the constant tillage is large therefore a value of the variation coefficient was more than the crop rotation.

The higher intensity of CO_2 decomposing from the irrigative alluvial meadow-forest soils was under the lucerne and onion, the least one was under cucumber, the rest plants take an interval stand in comparison. Decomposition intensity of CO_2 changed by 2,73-4,23 kg of CO_2 /ha per h on crop rotation in the irrigative alluvial meadow-forest soils, 2,85-3,19 kg of CO_2 /ha per h on the constant tillage, a variation coefficient changed by 10,37-17,16% and 13,67-17,16%.

Dynamics of the carbon dioxide gas intensity decomposing from the irrigative gleyey-yellow soils. A change amplitude of the intensity in the irrigaitve gleyey-yellow soils under the tomato was 5,17-6,57 kg of CO_2 /ha per h at the vegetation period (March-October), two maximums for an intensity were observed in July (6,15 kg of CO_2 /ha per h) and October (6,57 kg of CO_2 /ha per h). Decomposition intensity of CO_2 on the constant tomato tillage decreased in comparison with the crop rotation and was 4,39-5,86 kg of CO_2 /ha per h at the vegetation period. The mathematic analyses show that the decomposition intensity of $C0_2$ in the soils under the tomato was 5,86±0,168 on the crop rotation, 5,25±0,17 kg of CO_2 /ha per h on the constant tillage. A variation coefficient changed on the constant tillage in the largest interval.

Presence of the area under the constant plant under the white head cabbage+maize was a reason for an increase of CO_2 emissions in plant roots, microorganisms respiration shattering of the plant residues, therefore it positively influenced on CO_2 emission decomposing from the soil and intensity changed by 6,03-7,09 kg of CO_2 /ha per h in the research years, two maximums were noted in June (6,86 kg of CO_2 /ha per h) and October (7,09 kg of CO_2 /ha per h). A quantity of CO_2 decomposing from soil changed by 4,26-5,51 kg of CO_2 /ha per h in the constant white head cabbage tillage at the vegetation period two maximums for an intensity was noted in June (5,98 kg of CO_2 /ha per h) and October (5,84 kg of CO_2 /ha per h). A quantity of CO_2 decomposing form the soil surface under the constant maize changed by 4,26-5,5 kg of CO_2 /ha per h at the vegetation period. The mathematic analyses show that a quantity of CO_2 decomposing from the soil under the white head cabbage+maize version was 6,40±0,201; 5,30±0,180 kg of CO_2 /ha per h under the white head cabbage on the constant tillage and 4,97±0,175 kg of CO_2 /ha per h under the maize, a variation coefficient changed by 11,30-12,71% under every three version.

Decomposition intensity of CO_2 from the soils under the onion changed by 3,99-5,13 kg of CO_2 /ha per h at the vegetation period and two maximums for an intensity were in June (5,13 kg of CO_2 /ha per h) and October (4,86 kg of CO_2 /ha per h). An intensity on the constant onion tillage decreased in comparison with the crop rotation and changed by 3,30-4,02 kg of CO_2 /ha per h. The statistic calculations show that decomposition intensity of CO_2 in the soils under an onion changed by 4,55±0,303 on the crop rotation; 3,62±0,118 kg of CO_2 /ha per h on the constant tillage.

CO_2 quantity decomposing form the soils under the vegetable bean changed by 5,44-8,07; 4,90-7,21 kg of CO_2 /ha per h on the constant tillage, two maximums for an intensity were noted in July and October. The statistic-variation calculations show that an intensity changed by 6,47-7,06 under the vegetable bean; 5,86-6,42 kg of CO_2 /ha per h on the constant tillage; a variation coefficient changed by 14,03-16,44%.

The higher intensity of CO_2 decomposing from the irrigative gleyey-yellow soils was observed under the vegetable bean, the least one under an onion. A comparison of CO_2 decomposition intensity for an intensity of grey-brown, grey-meadow, alluvial meadow-forest and gleyey-yellow soils under an irrigative condition shows that a higher intensity of CO_2 was observed in the irrigative gleyey-yellow soils. Two or three maximums for CO_2 intensity decomposing from the soil were noted, depending on plants biology, development phase, soil-ecological condition it was met in June, July, August and October. A higher quantity of CO2 decomposing from soil surface under the growing plants was observed under the lucerne, vegetable bean, the least one was under the garlic, onion, the rest plants took an interval stand. Decomposition intensity of CO_2 from soil in comparative soil types was higher on crop rotation than the constant tillage.

5.4 Shattering Intensity of Cellulose

Hydrolyze of cellulose till monomers-glucose occurs in some stages and different ferments of the cellulose shattering complex system take part in this process. The soil cellulose activity is calculated for the indictors of the ferment complex sum participating in cellulose shattering. The separate aspects of the soil cellulose activity are reflected in some authors' works (Kiss and et al., 1978). The main aspects of the shattering intensity of cellulose in soil were learnt by K. A. Kozlov (1970) ecological and microbiological problems were learnt by N.N. Naplekova (1974). Differentiation for the biological indicators on the soil tillage layer-the presence of higher intensity of amino acids, collection cellulose shattering and CO_2 decomposition from soil, sacaharase and cellulose shattering microorganisms activity on the upper horizon, exposing of the biological activity to depression is observed on the low layers. The soils cellulose activity is in a positive correlative relation with the quantity of humus, nitrogen, phosphorus, some microelements (Kozlov 1970; Naplekova, 1974). Shattering of the plant residues depends on carbon quantity, relief, geographic condition. A quantity of the free amino acids collecting in linen setting in soil profile and the soil cellulose shattering ability shows biochemical process intensity. Unlike potential activity an actual biological activity depends on hydrothemic and oxyreductase condition to an important degree. An increase of the aerobe cellulose shattering microorganisms is observed as a result of improvement of aeration in soils cultivation on soil surface (Naplekova, 1974).

A quantity of the cellulose shattering microorganisms in the humid subtropic zone increase in spring and autumn (Mamedzade, 2004). Study of the cellulose shattering microorganims dynamics in alluvial-meadow soils shows that the soils cellulose shattering activity dynamically changes depending on humidity, a degree of ensuring with the nutrient of soil, irrigation period, quantity of atmosphere deposit (Merkusheva, 2004). The cellulose shattering intensity depends on nitrogen quantity, humidity, this process occurs in spring and autumn very intensively an influence of the temperature and soil type is little important, bacteria and actinomycetes participate actively fungus participate weakly in cellulose shattering in carbonate black soils (Voynova-Roykova, 1986). A main factor in the soils possessing good physical-chemical characters is humidity and temperature. The researches show that an effect of the temperature, humidity aeration, the plants biological characters and agrotechnical measures on cellulose shattering intensity is great, this depends on bacteria quantity, soil "respiration" and some ferments activity (Ahrens, 1977). According to some authors idea the cellulose shattering intensity by microorganisms depends on mineral nitrogen, especially, on nitrogen nitrate form in soil. There is not a total idea about an effect of the crop rotation and constant tillage on soil cellulose shattering ability among the researches. Some scientists say that cellulose shattering intensity is higher on the crop rotation than the constant tillage (Orudzheva, 2009), the others say that the it is higher on the constant tillage than the crop rotation (soddy-podzol soils) (Beresteskiy and et al., 1978) according to their experiments.

Dynamics of cellulose shattering intensity in the irrigative grey-brown soils. The surface and subsoil parts enter the soil after the plants perishing, and then they were subjected to the overturns by different microorganisms. An overturn of the high molecular combinations in the plant structure is performed by bacteria, actinomycetes, microscopic fungi. In order to learn an activity of the cellulose shattering microorganisms in the different soil types the shattering intensity of the linen placed in the soil profile with the "application" method under fodder and vegetable plants under irrigation condition. It is necessary to learn the cellulose shattering intensity (lignin, starch and etc) forming a main part of the plant organs, because their shattering plays an important role in ensuring of the plants with the nutrient, humification, prevention of the plant residues collection in the soil, carbon and nitrogen circulation. An intensity under the growing plants has been learnt and it was determined that it changed under a mutual influence of the soil-ecological condition, abiotic and biotic factors.

The cellulose shattering microorganisms activity under a version of the annual lucerne+barley in the irrigative grey-brown soils was 6,5-14,4% on 0-50 cm of layer and 8,6-15,9% under the two-year lucerne and two maximums were observed in June and October. A mathematic analysis of the cellulose shattering intensity show that an activity under an annual lucerne+barley changed by 9,7±0,812%; 12,0±0,674% under the two-year lucerne, a variation coefficient changed by 22,56-33,78%.

The cellulose shattering intensity under the watermelon changed by 7,3-12,7% on the 1^{st} and 2^{nd} schemes, an average value of the activity was 3,6 units less on the constant tillage than the 1^{st} scheme and 2,1 units less than 2^{nd} scheme. The mathematic statistic analyses show that an intensity on the 1^{st} scheme was 10,2±0,539%; 8,7±0,428% on the 2^{nd} scheme and 7,6±0,521 on the constant tillage, a variation coefficient changed by 17,69-27,53% under three versions.

An average value of the cellulose shattering microorganisms under the potato was 8,3% on the 1^{st} scheme;10,0% on the 2^{nd} scheme and 7,0% on the constant tillage, the mathematic analyses show that an intensity was higher on the crop rotation than the constant tillage.

A change amplitude of the cellulose shattering intensity under a garlic was 4,6-12,3% on the crop rotation and 4,4-7,4% on the constant tillage. The mathematic analyses show that a shattering intensity of the linen placed in the soil profile under the garlic was 8,1±0,684; 5,8±0,422 on the constant tillage, a variation coefficient changed in the largest interval on the constant tillage.

An intensity under a version of the white head cabbage+tomato changed by 8,4-14,3% and got a minimum value in August, for an intensity the two maximums were observed in June and October. An intensity changed under the tomato on the 2nd scheme was 8,2-12,3% in the research years; under the constant tomato changed by 5,8-10,7% at the vegetation period and two maximums for an activity were noted in June and October. A change interval of the shattering intensity of the linen placed on the soil profile under the constant white head cabbage was 3,1-11,3%. The statistic analyses show that the cellulose shattering intensity under a version of the white head cabbage+tomato formed 11,6±0,605; 10,4±0,523 under the tomato on the 2nd scheme, 7,3±0,724 under white head cabbage on the constant tillage and 7,8±0,524% under the tomato, a variation coefficient changed by 18,20-39,72% under every three versions.

A change amplitude of the intensity under the vegetable bean vibrated by 7,7-14,5% in the research years, 6,4-11,2% on the constant tillage, two maximums for an intensity were observed in July and October. A variation coefficient changed by 23,43-28,60% under the two versions.

A comparison of the cellulose shattering microorganisms for an intensity of the linen shattering in the irrigative grey-brown soils shows that an activity was higher under the lucerne, vegetable bean, less under the garlic; the rest plants took an interval stand.

Dynamics of the cellulose shattering intensity in the irrigative grey-meadow soils. The cellulose shattering intensity in the Shirvan plain irrigative grey-meadow soils was learnt by Orudzheva (2009). After the plants perished, great deals of residues enter the soil, and then they were subjected to different overturns. Some factors define the shattering intensity of the plant residues in the soil. The shattering intensity of the organic residues changed in different direction at the research period depending on organic residues structure of plant, soil-ecological condition, biology of the growing plants. A higher intensity under the growing plants was observed in June-July. The activity of cellulose shattering microorganisms on the crop rotation was 31,7-33,7% in March-October; 26,5-28,8% on the constant tillage.

The shattering intensity of cellulose under the two-year lucerne was higher and changed by 25,7-36,5%; 21,5-34,8% under an annual lucerne; 18,3-31,8% under the cucumber, 24,6-32,3 under the tomato;18,3-28,8% on the constant tillage under the tomato and 15,6-26,5% under the cucumber. Two maximums were noted under the lucerne in July and October, under the cucumber and tomato in June and October. An average value of the intensity on the crop rotation under the tomato was 28,1% and it was 4,7 units more than the constant tomato, 5,2 units more under the cucumber than the constant cucumber. The mathematic analyses show that an activity of cellulose shattering microorganisms on the crop rotation changed by 24,5-31,7%; 19,2-24,6% on the constant tillage, a variation coefficient changed by 13,55-18,50% and 18,34-28,13 %.

So, the results show that an shattering intensity of the plant residues was higher under the lucerne, on the crop rotation than the constant tillage.

Dynamics of the cellulose shattering intensity in the irrigative alluvial meadow-forest soils. The cellulose shattering intensity under the annual lucerne+barley on the crop rotation in the irrigative alluvial meadow-forest soils vibrated by 12,6-24,0% at the vegetation period (March, October); 16,6-33,5% under the two-year lucerne, two maximums were noted in July and October, the June maximum was very high. An intensity under the two year lucerne was 7,3 units (27,2%) higher than the annual lucerne+barley, it is obvious that a quantity of microorganisms under the two-year lucerne was much and that's why the plant residues shattering occurred intensively. The mathematic analyses show that the cellulose shattering intensity under an annual lucerne+barley changed by 19,5±1,086%; 26,9±1,478% under the two-year lucerne, a variation coefficient changed by 22,31-22,47%.

The cellulose shattering microorganisms activity changed by 11,6-21,4% in the soils under the onion in the research years and two maximums were noted in June and October. An intensity under the constant onion was 7,2-18,4% at the vegetation period. An average value of intensity was 4,2 units (26,3 units) less than crop rotation. An analysis for the soils cellulose shattering intensity under an onion shows that an activity on the crop rotation was higher than the constant tillage (16,0±1,075), a variation coefficient changed by 27,05-46,63% under both versions.

An activity of the cellulose shattering microorganisms changed by 8,9-23,6%; 7,5-18,6% on the constant tillage in the soils under the cucumber at the research period. An average of the intensity parameter was 3,7 units (22,2%) on the crop rotation than constant tillage under the cucumber. The mathematic analysis for an cellulose shattering intensity in the soils under the cucumber shows that an activity was 16,6±1,350 on the crop rotation; 13,0±1,074% on the constant tillage and a variation coefficient was higher on the constant tillage.

The shattering intensity of linen placed in the soil profile under the white head cabbage was 12,7-25,2% at the vegetation period; 10,9-19,8% on the constant tillage, two maximums under the both versions were noted in June and October. An average value of intensity was 3,8 units (20,7%) more on the crop rotation than the constant tillage. A statistic analysis of the activity under the white head cabbage shows that the cellulose shattering intensity changed by 18,4±1,140 on the crop rotation, 14,6±0,952% on the constant tillage, a variation coefficient changed by 26,19-27,11% under both versions.

The cellulose shattering intensity changed by 9,6-24,9% under the version of the green fodder+tomato at the research period, two maximums for an intensity were observed in July and October. An intensity under the constant tomato changed by 7,20-18,4% at the vegetation period and two maximums for an intensity were noted in June and September. An average value of the intensity under the green fodder+tomato version was 3,7 units (18,8%) more than the constant tomato. The mathematic analyses show that the cellulose shattering intensity was 20,0±1,380 under the green fodder+tomato version; 16,0±1,199% under the constant tomato, a variation coefficient changed by 27,74-46,63% under the both versions.

So, the higher quantity cellulose shattering intensity in the irrigative alluvial meadow-forest soils was under the lucerne, the least one was under the onion; the rest plants took an interval stand for an intensity. An intensity on the crop rotation changed by 16,0-26,9% under the separate plants,11,8-16,0% on the constant tillage, a variation coefficient changed by 22,31-32,71% and 26,19-46,63%.

Dynamics of the cellulose shattering intensity in the irrigative gleyey-yellow soils. An intensity in the irrigative gleyey-yellow soils under the tomato at the vegetation period was 19,1-29,5 and 16,3-26,4% on the constant tillage, two maximums for an intensity were noted in June and October. The mathematic analyses show that an intensity of the cellulose shattering microorganisms in the soils under the tomato was 23,8±1,218; 20,0±1,127% on the constant tillage. A vegetation coefficient changed on the constant tillage in the largest interval.

A value of the intensity under the white head cabbage+maize was 16,9-32,4%; 13,2-27,2% under the white head cabbage on the constant tillage and 13,8-29,6% under the maize at the vegetation period. Two maximums for an intensity under the constant white head cabbage and white head cabbage+maize version were noted in June and October, two maximums under the constant maize were noted in August and October. The mathematic analyses show that the cellulose shattering microorganisms intensity was 25,0±1,482 under a version of the white head cabbage+maize; 19,8±1,419 under the white head cabbage on the constant tillage; 22,4±1,533% under the maize, a variation coefficient was 21,42%; 25,90% and 24,68%.

A minimum value of intensity under the onion (11,19%) in August, a maximum value was (25,7%) in June. The statistic calculations show that an intensity was 17,5±1,696 under the onion, a variation coefficient was 35,01% and 31,22% on the constant tillage.

An intensity under the vegetable bean changed by 18,3-34,44% and a higher parameter was in June. An intensity changed by 17,8-28,5% under the constant vegetable bean. The mathematic analyses show that an intensity was 27,6±1,518% under a version of the vegetable bean, 23,1±1,351% on the constant tillage, a variation coefficient was 19,87% and 21,14%.

The higher intensity was under the vegetable bean version; the least one was under the onion. The researches show that the lowest value of the cellulose shattering microorganisms was observed in the irrigative grey-brown soils in comparison with the irrigative grey-meadow, alluvial meadow-forest and gleyey-yellow soils. A comparison for the plants cellulose shattering intensity shows that this parameter was higher under the lucerne, vegetable bean; the less was under the onion garlic and higher on the crop rotation than the constant tillage. The consequences show that using of the soils under the constant tillage weakness the plants residues shattering which plays a tropic relation for the plants feeding; including of the interval plants in the crop rotation was a reason for fertility with the additional plant residues of the soils and prevents from the humus substances mineralization for plants feeding.