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И ПРОДОВОЛЬСТВИЯ РЕСПУБЛИКИ БЕЛАРУСЬ

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АНГЛИЙСКИЙ ЯЗЫК

FIELD MANAGEMENT

*Сборник текстов и упражнений
для студентов УО БГСХА, обучающихся по специальностям
1-74 02 01 Агрономия, 1-74 02 02 Селекция и семеноводство*

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Приведены задания и упражнения для отработки навыков изучающего чтения и усвоения студентами терминологической лексики по агрономии.

Для студентов УО БГСХА, обучающихся по специальностям 1-74 02 01 Агрономия, 1-74 02 02 Селекция и семеноводство.

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ВВЕДЕНИЕ

Сборник текстов и упражнений предназначен для студентов агрономического факультета и рассматривает проблемы агротехнических технологий.

Цель сборника – отработка навыков изучающего чтения и усвоение студентами терминологической лексики по специальности.

Сборник состоит из десяти уроков. Каждый урок содержит предтекстовые упражнения, тексты и послетекстовые упражнения.

Комплекс предлагаемых упражнений представляет собой разнообразную структуру и предназначен для проверки понимания прочитанного (определение верных/неверных предложений, вопросно-ответные формы работы) и закрепления лексики текста (подбор синонимов/антонимов, перевод терминологических единиц с русского языка на английский и наоборот, заполнение пропусков в предложениях нужными словами и т. д.).

Материалы сборника можно использовать как для аудиторной, так и для самостоятельной работы.

UNIT 1

Agronomy

Exercise 1. Read and memorize the following words and word combinations.

treat of [tri:t əv] – рассматривать
soil science [sɔɪl 'saɪəns] – почвоведение
crop science [krɒp 'saɪəns] – растениеводство
crop production [krɒp prə'dʌkʃən] – производство с.-х. культур
manage ['mænɪdʒ] – обрабатывать
field management [fi:ld 'mænɪdʒmənt] – агротехника
farming practice ['fɑ:mɪŋ 'præktɪs] – полеводство
soil management [sɔɪl 'mænɪdʒmənt] – земледелие
still [stɪl] – вес еще
build up [bɪld ʌp] – создавать
poor [puə] – низкого качества
cultivate ['kʌltɪveɪt] – обрабатывать, выращивать
crop [krɒp] – сельскохозяйственная культура
research [ri'sɜ:ʃ] – научное исследование
originate [ə'rɪdʒəneɪt] – происходить
findings ['faɪndɪŋz] – полученные данные
wild species [waɪld 'spi:ʃi:z] – дикий вид
species ['spi:ʃi:z] – вид
yield [ji:ld] – урожай, давать урожай
cultivated species ['kʌltɪveɪtɪd 'spi:ʃi:z] – культурный вид

Exercise 2. Give the Russian equivalents and state the part of the speech of the following words.

Cultivate, cultivated, cultivation; improve, improvement, improvable; manage, managed, management; science, scientist, scientific, scientifically; field; yield, yielding; find, findings; include, included, including; culture, cultural; practiced, practicing; branch; plant, planted, planting; production, productive; agriculture, agricultural, agriculturist; genetics, geneticist.

Exercise 3. Give the Russian equivalents.

About the important branch, the efficient branch; in the modern crop production, the crop production of our country; soil science, to include soil science, to study soil science; findings, to write down the findings, soil management, systems of soil management, to improve soil management; natural conditions, farming practice, to improve farming practice.

Exercise 4. Find the translation for the words in A among those given in B.

A. Branch, farm, field, improve, soil management, field management, farmer, crop science, yield, body, soil, crop, findings, crop production, farming, species, soil science.

B. Полученные данные, тело, почва, вид, полеводство, почвоведение, растениеводство, хозяйство, отрасль, земледелец, улучшать, земледелие, производство с.-х культур, агротехника, поле, сельскохозяйственная культура, урожай.

Exercise 5. Translate the international words.

Agriculture, economics, coordination, system, production, role, genetics, physiology, botany, experiment, natural, information, practice, principle, manner.

Exercise 6. Read and translate the following text.

Agronomy is the branch of agriculture that treats of the principles and practice of crop production and field management. The term "agronomy" is the combination of two Greek words "agros" (field) and "nomos" (management). Under the term "agronomy" we include soil science and crop science. We do not know much of the origin of farm crop production. Primitive man did not grow plants. He lived on leaves, roots, seeds berries, and fruits. Farmers began to improve farming and soil management when they saw that poor farming practice gives poor yields.

Crop production began when man started to cultivate plants. The early farmer cultivated a limited number of crops, but he grew some grain crops which farmer grows at present. All important farm crops originated from wild species. Roman agriculture was the first of which we got some information from written documents.

Science helped, helps and will help to increase yields of crops. Findings in field and laboratory research are leading to new recommendations for efficient crop production. The farmer who follows the most efficient practices will get high yields. The grower who still farms as his father did when he was a boy is the farmer who does not and will not get high yields of crops.

A modern science of agronomy was built up by coordination of knowledge of different sciences, such as genetics, physics, plant physiology, botany, chemistry, economics, and many others. Scientists experimented, studied and wrote down their findings from good farming. They made many experiments with different cultivated and wild species of plants and different systems of soil management.

A brilliant school of soil scientists developed in Russia under the leadership of V. V. Dockuchaev. Russian scientists found out for the first time that soils are individual natural bodies. N. I. Vavilov, a Soviet scientist, did much for the development of crop science.

Exercise 7. Answer the following questions.

1. What does agronomy treat of? 2. What did a primitive man live on before? 3. When did farmers begin to improve farming and soil management? 4. What are findings in field and laboratory research leading to? 5. What sciences was agronomy built up? 6. What are V. V. Dockuchaev and N. I. Vavilov famous for?

Exercise 8. Translate the following words and word combinations.

Combination of two words, crop science, poor farming practice, limited number of crops, written documents, recommendations, get high yields, efficient crop production, field and laboratory, different sciences, brilliant school, different systems, good farming.

Exercise 9. State the tense of the verbs and translate the sentences.

1. Under science we understand knowledge arranged in an orderly manner. 2. Students will make many experiments in the laboratories. 3. Our scientists did much for the development of crop science. 4. Farmers began to improve farming and soil management centuries ago. 5. Scientists experiment and write down their findings. 6. Modern science developed rapidly.

Exercise 10. Put the following sentences into negative and interrogative forms.

1. Many modern framers follow efficient practices in agriculture.
2. Science will help to increase yields of crops.
3. Highly qualified specialists tried to improve soil management.
4. Contemporary farmers cultivate many crops.
5. Our agronomist developed a new system of crop rotation last month.
6. I shall get high yields of crops next year.
7. I make many experiments with different crops every summer.

Exercise 11. Match the words given in the box with their definitions.

Origin, plant, root, berry, soil, yield, laboratory, field, scientist, farm.
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1. A small roundish juicy fruit without a stone. 2. The place where something begins. 3. A living organism of the kind exemplified by trees, shrubs, herbs. 4. The area of open land, especially one planted with crops or pasture 5. The amount produced of an agricultural product. 6. The upper layer of earth in which plants grow. 7. The area of land and its buildings,

used for growing crops and rearing animals. 8. The person who is studying or has expert knowledge. 9. The part of a plant which attaches it to the ground. 10. A room or building equipped for scientific experiments.

Exercise 12. Translate from Russian into English the word combinations given in brackets

1. We (не знаем много) of the origin of farm crop production. 2. Crop production began when man started (возделывать растения). 3. The early farmer cultivated a (ограниченное число) of crops. 4. The farmer who (следует самым эффективным) practices will get high yields. 5. They (провели много экспериментов) with different wild species. 6. A brilliant (школа почвоведов) appeared in Russia.

Exercise 13. Translate the following sentences paying attention to the underlined words.

1. We saw the larvae on that crop in spring. 2. We observed this phenomenon under field conditions. 3. They found no fungus here. 4. This white larva feeds on the roots. 5. We can find many fungi on crop. 6. Some bacteria live in the soil. 7. The data are very important for crop production.

Exercise 14. True or false. Correct the false statements.

1. Agronomy is the branch of agriculture that treats of irrigation and canal building. 2. Primitive man grew a lot of plants. 3. All important farm crops originated from wild species. 4. Findings in field and laboratory research are totally useless for farmers. 5. Scientists made few experiments with six wild species of plants. 6. V. V. Dokuchaev developed a brilliant school of aircraft designers in Russia.

Exercise 15. Read and translate the text.

The primitive farmer grew a limited number of crops. He did not grow all crops that he grows now. Observations helped the farmer to improve his farming. From observations he learnt the best time, place and manner of cultivating crops.

At present observation still continues to help him to increase the yields of his crops. Agronomy had its beginning largely in the science of botany, chemistry, and physics. Botanical writings of cultivated plants began with the Greeks.

Chemistry had its origin in ancient alchemy. Lavoisier, often called the father of chemistry, lived in about 1770. The first book on agricultural chemistry came out in 1813.

Many agronomists became botanists, chemists, and experimenters. All cultivated plants originated from wild species. Primitive man used for food more than 3000 species of plants. Now people do not use all those species.

They use only some of them. Crop production was, is and will always be important because crop products play great role in people's life.

Exercise 16. Answer the questions.

1. What helped the farmer to improve his farming?
2. How did the farmer learn the best time, place and manner of cultivating crops?
3. In what sciences had agronomy its beginning?
4. When did Lavoisier live?
5. When did the first book on agricultural Chemistry come out?
6. From what species did all main cultivated plants originate?
7. Why is crop production important?

UNIT 2

Plants

Exercise 1. Read and memorize the following words and word combinations.

supply [sə'plai] – снабжать

shelter ['feltə] – приют, кров;

root [ru:t] – корень

reproductive [,ri:prə'dlktiv] – репродуктивный

absorb [əb'zɔ:b] – всасывать, впитывать

stem [stem] – ствол

plant food [plɑ:nt fu:d] – питание растений

connection [kə'nekʃən] – связь

support [sə'pɔ:t] – поддержка; поддерживать

serve [sɜ:v] – служить

storehouse ['stɔ:haus] – хранилище, кладовая

spread [spred] – распространять(ся)

dormant ['dɔ:mənt] – находящийся в состоянии покоя

embryo ['embriəu] – эмбрион, завязь

primitive ['primitiv] – первобытный

germination [,dʒɜ:mi'neiʃən] – прорастание

vegetative ['vedʒitativ] – растительный, вегетационный

annual ['ænjuəl] – однолетний

biennial [bi'eniəl] – двухлетний

perennial [pə'reniəl] – многолетний

mature [mə'tʃuə] – зрелый, спелый

supply [sə'plai] – запас, наличие

influence ['influənts] – оказывать влияние, влиять

provide [prə'vaɪd] – снабжать, обеспечивать

Exercise 2. Give the Russian equivalents and state the part of the speech of the following words.

Absorb, absorbed, absorption, absorbent; change, changed, changing; germinate, germination, germinating; reproductive, reproduction; support, to support, supporter; to serve, serving, served; to mature, matured, maturity; to require, required, requirement; moist, moisture; flower, flowering.

Exercise 3. Give the Russian equivalents.

Favourable conditions, under unfavourable conditions, dormant condition; a great supply, are supplied, will be supplied; are supported, were supported; to germinate immediately, the germination of seeds, the germinating seeds of wild species; supplied with moisture, without moisture; requirement, many requirements of plants, about the food requirement; a small embryo, besides embryo; stimulation, enough for stimulation, enough for transformation; main purpose, the main purpose of agronomy, to have the reproductive purpose.

Exercise 4. Find the translation for the words in A among those given in B.

A. Food, feed, germination, support, germinate, supply, main, purpose, condition, reproductive part, change, animal, favourable, between, connection, serve, moisture, stem.

B. Запас, служить, пища, связь, прорастание, корм, главный, кров, прорасть, поддерживать, стебель, цель, между, изменение, животное, благоприятный, влага, орган размножения, условие.

Exercise 5. Translate the international words.

Embryo, reproductive, signal, transformation, animalist, result, final, vegetation, cycle, temperature, classification, pass, season stimulate.

Exercise 6. Read and translate the following text.

Plants play a great role in people's life. They supply us with food, clothing, and shelter. Our food and clothing are mainly produced by plants. The flowering plant consists of four main parts: root, stem, leaf, and the reproductive part which is made of flowers and seeds.

The root. The main purpose of the root is to absorb water and plant food from the soil. Under favourable conditions water and plant food are absorbed from the soil through roots.

The stem. The plant stem serves as a connection between roots and leaves. The leaves and flower parts of most plants are supported by the stem. The stem may serve as a most important storehouse of energy.

The flower and seeds. Most of our plants are spread by seeds. Seeds are often used as food for man and feed for animals. Under favourable conditions dormant plant or embryo begins to grow.

The change from dormant condition to a condition of activity or growth is known as germination. Embryo begins to germinate when a seed is supplied with moisture, warmth and air. Over 3000 species of plants were grown by primitive farmer. Still more species are and will be grown by a modern farmer.

During its growth a plant passes through three stages: germination, the development of vegetative parts, and flowering with final production of seed. Some plants complete their cycle of growth within one season. Those plants are called annuals. There are plants which need two years to complete their cycle of growth. Such plants are called biennials. Besides there are plants which are known as perennials as they need more than two seasons to complete the growth cycle.

The first stage of plant growth is the germination of the seed. A mature or ripe seed consists of a small embryo and a supply of plant food. The young plant will be fed by this food supply during the first stage of its life. Three conditions are needed for the germination of seed. The first is a supply of water which is absorbed by the seed.

Next, the temperature must be high enough to stimulate the plant growth. Lastly, a supply of air from which the oxygen is got is necessary for the germinating seed and the growing embryo. Oxygen is needed to transform the food supply into the energy that will be required for plant growth. The germination of seed is influenced by these three conditions. A seed will not germinate if it is not provided with moisture, warmth, and air.

Exercise 7. Answer the following questions.

1. What is the plants' role in people's life?
2. What main parts do a flowering plant consist of?
3. What is the purpose of the root?
4. What is the plant stem for?
5. Are flowers and seeds important?
6. When does the embryo begin to germinate?
7. What stages does a plant pass while growing?
8. What can you tell about annuals, biennials, perennials?
9. What conditions are needed for the germination of a seed?

Exercise 8. Translate the following words and word combinations.

Food supply, flowering plant, main purpose, plant food, through roots, from the soil, storehouse of energy, dormant plant, embryo, germination, warmth and air, species, final production, cycle of growth, two seasons, first stage, supply of water, oxygen.

Exercise 9. Translate the following sentences paying attention to the predicate.

1. Plants produce our food and clothing. Our food and clothing are produced by plants. 2. The roots of a plant absorb water and plant food from the soil. Water and plant food are absorbed from the soil by roots. 3. The stem supports the leaves and flower parts of most plants. The leaves and flower parts of most plants are supported by the stem. 4. Man often uses seeds as food. Seeds are often used as food for man.

Exercise 10. Translate the following sentences paying attention to the Passive Voice.

1. The plants that complete their cycle of growth within one season are called annuals. 2. There are plants which are known as biennials and perennials. 3. The young plant will be fed by the food supply during its first stage. 4. Three conditions were needed for the proper germination of seed. 5. Oxygen is needed to transform the food supply into the energy that will be required for plant growth. 6. The plant growth is influenced by climatic conditions.

Exercise 11. Complete the sentences using the text.

1. The germination of seed is
2. The young plant will
3. Some plants complete their
4. Embryo begins to germinate when
5. Under favourable conditions water

Exercise 12. Translate into English the following word combinations.

Три условия, влага, трансформировать питание, запас воздуха, рост растения, первая стадия, прорастание зерна, молодое растение, за один сезон, растительная часть, конечная продукция, завершить цикл, корм для животных, растение и эмбрион, состояние роста, хранилище энергии, благоприятные условия, влага, тепло, спелое зерно.

Exercise 13. Translate from Russian into English the word combinations given in brackets.

1. The (главное назначение) of the root is (впитать воду) and plant food (из почвы). 2. Our food and (одежда) are mainly (производятся

растениями). 3. The (листья и цветочные части) of most plants are (поддерживаются стволом). 4. Embryo (начинает прорастать) when a seed is supplied with (влагой, теплом и воздухом). 5. Still (больше видов) are and will be grown by a (современным фермером). 6. Some plants (завершают свой цикл) of growth within (одного сезона). 7. Next, the temperature must be (достаточно высокой) to stimulate the (рост растения). 8. A (зерно не прорастет) if it is (не снабжено) with moisture, warmth and air.

Exercise 14. Match the pairs of synonyms of the following words.

- | | |
|----------------|--------------|
| 1) clothing | a) backward |
| 2) consist | b) finish |
| 3) connection | c) phase |
| 4) significant | d) dress |
| 5) primitive | e) important |
| 6) complete | f) compose |
| 7) seed | g) change |
| 8) stage | h) link |
| 9) transform | i) grain |

Exercise 15. Translate from English into Russian the following sentences

1. There are wild and cultivated species of plants. 2. There were plants which needed two years to complete their life cycle of growth. 3. There are plants which are known as perennials. 4. There will be moisture, warmth and air for germinating seed. 5. There are many factors which influence the growth of all plants. 6. There were very few roots in this plant. 7. There will be very good flowers on that tree. 8. There are cultivated plants which are very productive. 9. There were different crops on the farm. 10. There will be a high temperature in the room.

Exercise 16. Read and translate the text.

All cultivated and wild plants are classified as annuals, biennials and perennials.

Annuals. There are plants that start their growth in the spring or summer. Then they flower, reproduce themselves and die with maturity or when frost comes or other unfavourable conditions. These are annual plants. Annual is a plant which completes its life cycle during the same year. Many of our most important crops, such as grain crops, are included in this group.

Biennials. These are plants which complete their life cycle in two years. Plants of this type produce leaves and well developed roots the first year;

stems, flowers and seeds will be produced the second year and their life cycle will be completed.

Perennials. Plants which live more than two years are known as perennials. Many of farm crops are perennials. Perennial plants are reproduced with the help of seeds, roots, tubers. The growth of all plants is greatly influenced by many factors, such as plant food, water, temperature, air, and others.

Exercise 17. Translate the following sentences using the text.

1. Все культурные растения подразделяются на однолетние, двухлетние и многолетние.

2. Однолетнее растение заканчивает свой цикл развития в течение одного года.

3. Двухлетние растения проходят свой цикл развития в течение двух лет.

4. На рост всех растений влияют многие факторы, такие, как питание, влага, температура, воздух и другие.

UNIT 3

Plant Nutrients

Exercise 1. Read and memorize the following words and word combinations.

essential [ɪ'senʃəl] – необходимый

nitrogen ['naɪtrədʒən] – азот

phosphorus ['fɒsfərəs] – фосфор

potassium [pə'tæsiəm] – калий

oxygen ['ɒksɪdʒən] – кислород

carbon ['kɑ:bən] – углерод

hydrogen ['haɪdrədʒən] – водород

iron ['aɪən] – железо

copper ['kɒpə] – медь

chlorine ['klɔ:ri:n] – хлор

zinc [zɪŋk] – цинк

calcium ['kælsiəm] – кальций

potassium [pə'tæsiəm] – калий

sulfur ['sʌlfə] – сера

tissue ['tɪʃju:] – ткань

manganese ['mæŋɡəni:z] – марганец

boron ['bɔ:rən] – бор

molybdenum [mə'libdənəm] – молибден
trace element [treɪs 'elɪmənt] – следовой элемент, микроэлемент
adequate supply ['ædɪkwət sə'plaɪ] – достаточное количество
available [ə'veɪləbl̩] – доступный
deficient [dɪ'fɪʃənt] – недостающий, отсутствующий
semiarid [ˌsemi'ærɪd] – полужасушливый
adequate ['ædɪkwət] – достаточный
lodging ['lɒdʒɪŋ] – полегание
maturity [mə'tʃʊərətɪ] – спелость, зрелость (*плодов*)
fruiting [fru:tɪŋ] – плодоношение
legume ['legju:m] – бобовое (стручковое) растение

Exercise 2. Give the Russian equivalents and state the part of the speech of the following words.

Area, areal, to avail, available, availability, deficient, deficiency, humid, humidity, quality, semiarid, cereal, to cause, caused, causing, to lodge, lodging, sufficient, sufficiency, sufficiently, usually, collectively.

Exercise 3. Give the Russian equivalents.

Plant nutrients, required plant nutrients, absorbed plant nutrients, essential plant nutrients, tissue of plants, in the tissue of plants, found in the tissue of plants, essential supply, adequate supply, contains adequate amounts, available nutrients, unavailable nutrients, to require available nutrients, their low availability, deficient in semiarid regions, sufficient in the most humid areas, proper growth of cereals, maturity of the cereals, phosphorus deficient symptoms, nitrogen sufficient symptoms, potassium deficiency causes.

Exercise 4. Find the translation for the words in A among those given in B.

A. Tissue, quantity, humid, low, lower, deficiency, proper, nutrient, abundant, iron, semiarid, contain, availability.

B. Правильный, влажный, низкий, дефицит, питательное вещество, количество, железо, понижать, ткань, полужасушливый, содержать, доступность, обильный.

Exercise 5. Translate the international words.

Element, microelement, macroelement, maximum, period, mineral, tendency, result, arrest, concentrate, adequate, symptom.

Exercise 6. Read and translate the following text.

There are at least 15 elements which are essential for proper plant growth. The most important elements are nitrogen, phosphorus, potassium, oxygen, carbon, hydrogen, iron, copper, zinc, and others. Some of these

elements, such as calcium, potassium, nitrogen, phosphorus and sulfur are found in the largest quantities in the tissue of plants. They are called macroelements. Other elements, such as copper, manganese, zinc, boron, molybdenum found in lesser amounts are called microelements or trace elements. The 15 essential elements are usually referred to as "plant nutrients" or "plant food". An adequate supply of plant nutrients is absolutely necessary to maximum agricultural production. Plants can absorb plant nutrients which are present in the soil in available form.

Good soils contain adequate amounts of available nutrients to meet the requirements of the crop plant during all periods of growth. The more available the plant nutrients, the better the plant growth. The less the amounts of available nutrients, the poorer is the plant growth. Elements may be deficient in soils or their availability may be low. As a rule, mineral elements are abundant in semiarid regions and deficient in the most humid areas. Nitrogen is absolutely essential to proper plant growth. Plants grown on soils with sufficient amount of available nitrogen make a good rapid growth with a healthy green colour. Adequate supply of nitrogen has a tendency to increase stem and leaf development. Deficiency of this element results in plants of poorer colour, poorer quality, and lower production.

Too heavy supply of nitrogen in the soil tends to cause lodging, late maturity, and poor seed development. Adequate amounts of phosphorus in soils produce rapid plant growth and early fruiting or maturing. Phosphorus, like nitrogen, is found in the growing parts of plant, the flower and the seed. Plants require large amounts of potassium, one of the most essential elements for better plant growth. Different crops remove different amounts of it from the soil. While cereals remove the least amounts of potassium, legumes absorb the largest ones and largely lower the available potassium level of soils. The more legumes are grown, the lower is the potassium level in soils.

Exercise 7. Answer the following questions.

1. What elements are called macroelements?
2. What elements are referred to as "plant nutrients"?
3. What is absolutely necessary to maximum agricultural production?
4. In what form can plants absorb plant nutrients?
5. In what regions are mineral elements abundant in the soil?
6. How do the plants grown on soils with enough nitrogen look like?

Exercise 8. State the positive degree of the adjective.

Less, lowest, higher, smaller, poorer, most, worst, least, best, lower, better, largest, later, greener, earlier.

Exercise 9. Form the comparative and superlative degrees of the given adjectives.

Little, good, bad, necessary, high, low, healthy, different, deficient, much, important, poor, available, essential, humid, large, adequate.

Exercise 10. Translate the following expressions paying attention to the degrees of the adjectives.

Rich soil, richer soil, the richest soil, large field, larger field, the largest field, humid area, more humid area, the most humid area, good system, better system, the best system, available nutrient, less available nutrient, the least available nutrient, bad practice, worse practice, the worst practice.

Exercise 11. Translate the following sentences paying attention to the constructions “as ... as; not so ... as”.

1. The range of the temperature of the air is not so great as the range of the temperature of the ground. 2. Phosphorus is as important for proper growth of plants as nitrogen and potassium. 3. Nitrogen must be as available to plants as other nutrient elements. 4. Microelements in the soil are as essential as macroelements.

Exercise 12. Translate the following sentences paying attention to the construction “the more ... , the less ... ”.

1. The more we study nature, the more we know about it. 2. The more legumes are grown, the lower is the potassium level in the soils. 3. The more we know about plant nutrients, the better we can supply our crops with them. 4. The less are the amounts of nutrients, the poorer is the plant growth.

Exercise 13. Find the equivalents for the following words and word combinations in the text.

Надлежащий рост растений, ссылаться на, достаточный запас, сельхозпроизводство, доступная форма, удовлетворять потребности, период роста, макроэлемент, самые важные элементы, недостаточный, полувсасушливый регион, здоровый цвет, иметь тенденцию, быстрый рост, цветок, зерно, различные сельхозкультуры, хлебные злаки, бобовые.

Exercise 14. Translate the following word combinations paying attention to the prepositions.

Essential for growth, present in the soil, found in large quantity, in tissue, supply of nutrients, necessary to production, in available form, amount of nutrients, requirements of crop, period of growth, deficient in soil, abundant in semiarid region, essential to plant growth, amount of nitrogen, found in growing parts, remove from soil, elements for growth.

Exercise 15. Translate the following sentences into English in a written form.

1. Такие элементы как медь, марганец, цинк, бор, молибден называются микроэлементами. 2. Питательные вещества поглощаются из почвы корнями растений. 3. Плодородные почвы содержат достаточное количество питательных веществ, чтобы удовлетворять потребности культур. 4. Азот является одним из самых важных питательных элементов. 5. Недостаточное количество питательных элементов приводит к недостаточному развитию всех частей растения.

Exercise 16. Read and translate the text.

Phosphorus is as important for proper growth of plants as nitrogen and potassium. Most of plants require phosphorus in quantities that are much smaller than those of nitrogen and potassium. Phosphorus is present in all living tissues. It is concentrated in the younger parts of the plant, in flowers and seeds.

An adequate supply of phosphorus early in the life of the plant is very important. Its importance to growth has long been known. Growth is retarded when the supply of phosphorus in the soil is very low, and phosphorus from the older tissues moves to the younger ones. Usually, symptoms of little phosphorus appear first in the lower leaves which are the older ones. A deficiency of this element may stop maturity of the plant. Some species of plants absorb smaller quantity of phosphorus, than other ones. Phosphorus is one of the most essential nutrients of plants. The more we know about the plant requirements of phosphorus, the better we can supply our crop plants with it.

Exercise 17. Answer the following questions.

1. What element is as important for plants as nitrogen and potassium?
2. In what quantities do plants require phosphorus?
3. In what parts of the plant is phosphorus concentrated?
4. What occurs when the supply of phosphorus in the soil is very low?
5. Where do symptoms of little phosphorus first appear?

UNIT 4

Soils

Exercise 1. Read and memorize the following words and word combinations.

loose [lu:s] – рыхлый

matter ['mætə] – вещество

weathering ['weðərɪŋ] – выветривание, эрозия
 rotting ['rɒtɪŋ] – гниение
 relative ['relətv] – сравнительный
 proportion [prə'pɔːʃən] – соотношение
 gravel ['græv(ə)l] – гравий
 clay [kleɪ] – глина
 fine [faɪn] – мелкий
 sticky ['stɪkɪ] – липкий, клейкий
 plastic ['plæstɪk] – пластичный
 predominate [prɪ'dɒmɪneɪt] – преобладать, превалировать
 silt [sɪlt] – ил, наносы,
 peat [pi:t] – торф
 porous ['pɔːrəs] – пористый
 pore [pɔː] – пора
 layer ['leɪə] – слой, пласт;
 phosphoric acid [fɒs'fɔːrɪk 'æsɪd] – фосфорная кислота

Exercise 2. Give the Russian equivalents and state the part of the speech of the following words.

Organic, organically, loam, loamy, particle, peat, weather, weathering, rock, rocky, rot, rotted, rotting, loose, loosed, loosing, sand, sandy, surface, surfacing, compose, composed, composing, composition, composer, decompose, decomposed, decomposing, decomposition, texture, textured, mix, mixed, mixing, mixer.

Exercise 3. Translate the international words.

Mixture, mineral, organic, inorganic, material, form, temperature, organism, type, base, proportion, gravel, compose, composition, decomposition, plastic, texture, granular, dominate, predominate, per cent, substance.

Exercise 4. Find the translation for the words in A among those given in B.

A. Granular, particle, rock, peat, appearance, loam, layer, weathering, silt, loose, gravel, sticky, clay, surface.

В. Липкий, поверхность, выветривание, ил, глина, рыхлый, гравий, торфяник, суглинок, горная порода, внешний вид, зернистый, слой, частица.

Exercise 5. Give the Russian equivalents.

Loose surface, to loosen a surface; to weather, weathering, a favourable weather; temperature, soil temperature, relative proportion, relative proportion of soil; particles, fine particles, very fine particles; sticky texture,

sticky plastic texture; various types, various operations; to vary greatly, to vary with; sandy soil, heavy soil, clay soil, silt soil; loam, loamy soil, light soil, heavy soil; this light soil, that heavy soil.

Exercise 6. Read and translate the following text.

Soil is the loose surface layer of the earth in which plants can grow. Soil is the mixture of mineral and organic material. The mineral matter is formed by weathering of rocks. Organic matter is formed by rotting of plant and animal material with the help of water, wind, air, temperature changes, and soil organisms. Soil types may be based upon the relative proportion of soil materials. Soil materials consist of stones, gravel, sand, silt, clay and organic matter.

Clay is composed of very fine particles. When it is mixed with other soils, it gives them a sticky plastic texture. Silt consists of particles smaller than sand, but granular in appearance. The various types of soil may be found over the surface of the earth. Clay soil is the soil in which plastic clay predominates. Sandy soil is the soil which contains little silt or clay.

Loam is composed of sand, silt, clay and organic matter. Peat soil is the soil which may contain twenty-five to seventy-five per cent of organic matter with loam. In addition such soil conditions as air supply, water supply, temperature, supplies of nutrients and others influence directly the life of a plant.

Air supply. The soil is a porous mass. Air is able to enter the soil through pores. Soils may vary considerably in their porosity. The amount of space between the soil particles varies with the type of soil. The pore space may be occupied by either air or water. Plant roots are continually taking oxygen from the air of the soil.

Water supply. Water is retained in the pores of the surface layers. The quantities of water vary with the different types of soil. Too much water in the soil is undesirable for it may cause rotting.

The temperature of the soil. The sun is the main source of soil heat. Soil temperature influences the germination of seeds and the growth of plants. At very low temperatures there is no growth.

Plant nutrients. Soil contains four main compounds of plant food: nitrogen, phosphoric acid, potash and lime. Fertile soils contain most of nutrients required by plants. Infertile soils are poor in them. Any agriculturist must know that he will be able to improve the soil conditions with the help of the proper management of the soil.

Exercise 7. Answer the following questions.

1. What can you say about soil?

2. How is the organic matter formed?
3. What do the soil materials consist of?
4. How can we make a sticky plastic texture?
5. Is peat soil so valuable?
6. What soil conditions influence the life of a plant?
7. What is the pore space occupied by?
8. What can cause too much water in the soil?
9. The soil temperature does not influence the germination of seeds, does it?
10. What are the four main compounds of plant food?

Exercise 8. Find the equivalents for the following words and word combinations in the text.

Слой земли, смесь материалов, гниение, животный материал, почвенный организм, маленькая частица, ил и глина, органическое вещество, по внешнему виду, поверхность земли, преобладать, суглинок, почвенные условия, пористая масса, количество пространства, тип почвы, вызывать гниение, температура почвы, прорастание зерна, низкая температура, соединение, неплодородный.

Exercise 9. Choose the best variant.

1. Fertile soils contain (least, little, most) of nutrients required by plants.
2. At very (high, low, temperate) temperatures there is no growth.
3. The quantities of (stones, water, clay) always vary with the different types of soil.
4. Plant roots are continually (taking, providing, creating) oxygen from the air of the soil.
5. Silt consists of particles (bigger, nicer, smaller) than sand, but granular in appearance.
6. Organic matter is formed by (absorbing, rotting, mixing) of plant and animal material.

Exercise 10. Fill in the gaps with the words given in the box.

Particles, contain, sun, clay, sandy, mineral, occupied, which, retained.

1. The ... matter is formed by weathering of rocks.
2. ... is composed of very fine particles.
3. Silt consists of ... smaller than sand, but granular in appearance.
4. ... soil is the soil which contains little silt or clay.
5. Clay soil is the soil in ... plastic clay predominates.
6. Peat soil may ... twenty-five to seventy-five per cent of organic matter.
7. The pore space may be ... by either air or water.
8. Water is ... in the pores of the surface land layers.
9. The ... is the main source of soil heat.

Exercise 11. Translate the following sentences paying attention to the verb *to be*.

1. He will be an agronomist of a large agricultural enterprise. 2. Water and air are held in the pores of the soil. 3. Plant roots are taking oxygen from the air of the soil. 4. These crops were planted in spring. 5. Any agriculturist should know that his most important task is the proper management of the soil. 6. The rye will be planted in a week. 7. The soil is a porous mass. 8. There are different types of soils in our country.

Exercise 12. Translate the following sentences paying attention to the model verbs and their equivalents.

1. Sand, silt, clay may be called mineral matter. 2. Plants are able to grow in the loose layer of the earth. 3. Clay may be mixed with other soils to make a sticky and plastic texture. 4. Plant and animal material must be rotted to form organic matter. 5. Sandy soil may contain little or no silt or clay. 6. Many vegetables can grow in the north of our country. 7. The roots of plants have to absorb nutrients from the soil. 8. The farmers are allowed to harvest cabbage. 9. This farm is able to get high yield of vegetables this year. 10. Grasses can grow on various types of soil. 11. This farm had to obtain high yield of crops. 12. These types of soil should be studied well.

Exercise 13. Translate the following words and word combinations.

Fertile soils, proper management, soil condition, main compound, main source, agriculturist, undesirable, quantity of water, pores of the surface layer, soil particle, porosity, enter through pores, contain little silt, peat soil, clay soil, sandy soil, granular in appearance, various types of soil, sticky texture, soil material, relative proportion, rotting of plant, loose surface, potash and lime.

Exercise 14. Translate the following sentences into English in a written form.

1. Студенты нашей академии изучают ботанику, чтобы знать, как развивается растение. 2. Данное поле слишком неплодородно, чтобы давать высокие урожаи. 3. Чтобы впитывать питательные вещества, растение должно иметь корни. 4. Чтобы выращивать эту культуру, мы должны иметь плодородную почву. 5. Для того чтобы получать высокие урожаи, нам необходимо много удобрений. 6. Свет очень важен для прорастания зерна и развития растения. 7. Микроэлементы играют важную роль в производстве высоких урожаев сельхозкультур.

Exercise 15. Read and translate the text.

The most common soils on the British Islands are clay soils, sandy soils, loams and peat soils.

Clay soils. They are characterized by the presence of considerable quantities of clay and silt. Air and water cannot move freely in them. Therefore, they become waterlogged, and in time of drought are unable to supply the plant with water. Clay soils should not be cultivated when they are wet. During hot dry seasons clay soils dry and form large cracks which may do much damage to plant roots. These soils are heavy and need proper cultivation and management.

Sandy soils. These soils have an open texture. They are very porous and do not retain moisture. They are light. Sandy soils are poor in plant nutrients. Organic matter has to be applied constantly to keep up their fertility.

Loams. Loam soils have advantages of both clay and sandy soils. Loams are easy in cultivation, well supplied with air, and prevent from becoming waterlogged. These soils are very good for farming.

Peat soils. These soils can be found in places where an accumulation of organic matter under waterlogged conditions took place. They are fertile and should be used for many crops.

Exercise 16. Answer the following questions.

1. What are the most common soils on the British Islands? 2. How are clay soils characterized? 3. Can air and water move in clay soils? 4. What do clay soils need? 5. Do sandy soils retain moisture? 6. What should be done to keep up the fertility of sandy soils? 7. Why are loams very good for farming? 8. Where can peat soils be found?

UNIT 5

Tillage Practices

Exercise 1. Read and memorize the following words and word combinations.

tillage practice ['tɪlɪdʒ 'præktɪs] – прием механической обработки почвы

purpose ['pɜːpəs] – цель

till [tɪl] – возделывать землю, пахать

cultivation [ˌkʌltɪ'veɪʃən] – возделывание, культивация

tillage ['tɪlɪdʒ] – обработка почвы

bring about [brɪŋ ə'baʊt] – создать

seedbed ['siːdbed] – почва

competition [ˌkɒmpə'tɪʃən] – конкуренция

secure [sɪ'kjʊə] – гарантировать, обеспечивать
 vegetation [ˌvedʒɪ'teɪʃən] – растительность
 sod [sɒd] – дерн
 rotation [rə'teɪʃən] – севооборот
 loosen ['luːsən] – разрыхлять
 compact [ˌkəm'pækt] – уплотнять
 pulverize ['pʌlvəraɪz] – рыхлить
 plowing ['pləʊɪŋ] – вспашка
 removal [rɪ'muːvəl] – удаление
 harrowing ['hærəʊɪŋ] – боронование
 rolling ['rəʊlɪŋ] – укатывание катком
 cultivating [ˌkʌltɪ'veɪtɪŋ] – почвообработка, культивация, рыхление
 delay [dɪ'leɪ] – замедлять, препятствовать
 roughening ['rʌfənɪŋ] – придание шероховатости, рифление
 immediate surface [ɪ'miːdiət 'sɜːfɪs] – поверхностный слой
 check [tʃek] – препятствовать; ограничивать, сдерживать
 erode [ɪ'rəʊd] – подвергаться эрозии
 subject to [səb'dʒekt tu] – подвергать (*воздействию, влиянию и т. п.*)
 fine [faɪn] – мелкокомковатый
 moist [mɔɪst] – влажный

Exercise 2. Give the Russian equivalents and state the part of the speech of the following words.

Plough, ploughed, ploughing; rotate, rotation, rotated, rotating; suit, suitable, unsuitable; till, tilled, tilling, tillage; destroy, destroyer, destroyed, destroying, destruction; harrow, harrowed, harrowing; pulverize, pulverized, pulverizing; roll, rolled, rolling; weed, weeded, weeding.

Exercise 3. Find the translation for the words in A among those given in B.

A. Weed, rotation, seedbed, destroy, competition, roll, plow, harrow, suitable, pulverize, tillage, sod, compact, erosion.

B. Каток, конкуренция, пахать, чередование, подходящий, сорняк, боронить, уничтожать, дерн, эрозия, плотный, разрыхлять, борона, обработка земли, почва.

Exercise 4. Give the Russian equivalents.

Suitable conditions, unsuitable conditions, suitable seedbed, tillage practices, tillage operations, destruction of weeds, preparation of the seedbed, crop rotation, under crop rotation, due to crop rotation, to eliminate competition from weeds, competition for plant nutrients, to

prevent from erosion, water and wind erosion, due to erosion, depth of plowing, long field, length of seedbed, high yield, height of growth.

Exercise 5. Translate the international words.

Operation, physical, physically, chemical, chemically, biological, biologically, start, compact, general, generally, condition, erosion, rotation, pulverize, pulverization.

Exercise 6. Read and translate the following text.

Man has tilled the soil since he started the cultivation of plants. Tillage may be defined as the practice of working the soil to bring about favourable conditions for plant growth. Tillage has generally prevented the soil from water and wind erosion.

The purposes of tillage have always been: (1) to prepare a suitable seedbed, (2) to eliminate competition from weeds, and (3) to improve the physical condition of the soil. The aim of all these operations has always been the preparation of the soil which will be favourable physically, chemically and biologically. The chief reason for preparing the seedbed well has always been to secure high crop yields.

In the preparation of the seedbed it may be necessary to destroy native vegetation, sod or another crop in the rotation, or weeds and to turn them under. The tillage operation is to loosen, compact or pulverize the soil. The destruction of weeds through tillage removes their competition for plant nutrients, water and sunlight. The most common tillage operations are plowing, harrowing, rolling and cultivating.

Plowing. Plowing is usually the first and the most important step in the preparation of the seedbed. The soil should not be too dry or too wet when the plowing is done.

The reasons for plowing in seedbed preparation have always been: (1) removal from the surface of either green or dried material, (2) loosening the soil, (3) removal or delay of weeds, (4) roughening the immediate surface so as to check runoff of rain water.

Time of plowing. Plowing may be done as soon as the previous crop has been removed from the land. Some farmers prefer to plow land in fall, others in spring. The agricultural experimental stations have made many studies on the time of plowing. Most of these have shown little difference in the yields of crops on fall plowed land as compared to spring plowed land.

The best time for plowing has generally depended upon the local conditions. However, fall plowing has not been done on land subject to winter erosion or winter compaction. Spring plowing has always been practiced on soils that erode easily, especially where rainfall is heavy during

the winter months. Soils low in organic matter have been plowed in the spring to make them more easily cultivated.

Harrowing. The final preparation of the seedbed is harrowing. Harrowing makes the soil fine, loose and deep enough to provide good contact between the seed and moist soil.

Exercise 7. Answer the following questions.

1. How long has man tilled the soil?
2. What are the purposes of tillage?
3. What is the chief reason for preparing the seedbed well?
4. What does the destruction of weeds lead to?
5. What do you know about plowing?
6. What do the studies of agricultural experimental stations show?
7. What kind of plowing has always been practiced on soils that erode easily?
8. Why is harrowing so important for tillage?

Exercise 8. Find the equivalents for the following words and word combinations in the text.

Возделывание сельхозкультур, обработка почвы, благоприятные условия, подходящая почва, уничтожить конкуренцию, физическое условие, главная причина, высокий урожай, севооборот, уничтожение сорняков, солнечный свет, ветровая эрозия, важный этап, сухой материал, предыдущий, осенняя вспашка, уплотнение, заключительная подготовка.

Exercise 9. Translate from Russian into English the word combinations given in brackets.

1. Tillage has generally prevented the soil from (водная и ветровая) erosion. 2. The (цель этих операций) has always been the preparation of the soil which will be favourable (физически, химически и биологически). 3. The tillage operation is to loosen, (уплотнить или разрыхлить) the soil. 4. The most common tillage operations are plowing, (боронование, укатывание и культивация). 5. Some (фермеры предпочитают) to plow land in the fall, others (весной). 6. Fall plowing has not been done on (земля, подверженная зимней эрозии) or winter compaction.

Exercise 10. Translate into Russian.

Favourable conditions for plants, purposes of tillage, to improve the physical condition, preparation of the soil, high crop yield, destroy native vegetation, crop in the rotation, turn weeds under, destruction of weeds, water and sunlight, be too dry or too wet, green material, delay of weeds,

check runoff of water, plow land in fall, agricultural experimental stations, show little difference, provide good contact.

Exercise 11. Give the base form of the following Past Participles.

Grown, known, harrowed, shown, loosened, been, done, made, begun, practiced, studied, written, spoken, broken, sown, seen, cultivated, eliminated, compared, removed.

Exercise 12. Translate the following sentences paying attention to the verb *to have*.

1. They have to grow some grain crops. 2. They have fertile soils on this farm. 3. Many trees have been planted in the streets of our native town this year. 4. This work had to be done by hand. 5. This collective farm has already done all tillage operations in its fields. 6. They had harrowed their fields thoroughly before they sowed spring wheat. 7. We have never plowed soils when they are wet. 8. They will have to do this work soon. 9. They had to apply that fertilizer the day before yesterday.

Exercise 13. Translate the following sentences paying attention to the Perfect forms.

1. Plowing has always been the first step in the preparation of the seedbed. 2. The seedbed for winter wheat had been plowed before it rained heavily. 3. Harrowing has made the soil fine and loose enough. 4. Plowing was done after the previous crop had been removed. 5. The agricultural experiment stations have made many studies on the time of plowing in spring. 6. They will have sown this crop by the end of the month. 7. The vegetables will have been harvested by the first frosts.

Exercise 14. Translate the following sentences paying attention to the *adverbs* used with the Perfect forms.

1. The private farm has **already** done all tillage operations. 2. Clay soils have **never** been plowed when they are wet. 3. The effect of soil erosion had **always** been considered in planning all tillage operations. 4. Granulated mixtures will have **already** been applied to the soil by Friday. 5. Fall plowing has **never** been done on land subject to winter erosion. 6. Has he **ever** observed that phenomenon in the field? 7. Spring plowing has **not** been done **yet**. 8. Harrowing has **just** been done.

Exercise 15. Read and translate the text.

The preparation of a good seedbed is one of the most important factors in getting high yields. If the soil has been tilled well we may expect good results.

Plowing is important for the preparation of a good seedbed. This operation loosens the soil, turns under the vegetable material, and mixes it

with the soil. Plowing also destroys weeds which rob the soil of nutrients that should be used by growing crops.

Time of plowing generally depends on the climatic and soil conditions. Sometimes plowing is done in the fall, sometimes in the spring. If plowing had been done in the fall, it hastens spring-planting operations. The first spring tillage on the fall plowed land hastens the drying of the surface and often permits an early planting.

On heavy soils spring plowing has never been desirable. On such soil types plowing the land in early spring when it is too wet may ruin the physical condition of the soil. Heavy soils have been often successfully plowed in the fall. In this case time is saved, and changes of weather improve soil structure.

Soils of light types have generally been plowed in the spring to save their nutrients for crops.

Exercise 16. Answer the following questions.

1. Does preparation of a good seedbed result in high yields?
2. What is the purpose of plowing?
3. Does the first spring tillage permit an early planting?
4. When should the heavy soils be plowed?

UNIT 6

Fertilizers

Exercise 1. Read and memorize the following words and word combinations.

decompose [di:kəm'pəuz] – гнить, разлагаться

parent rock ['peərənt rɒk] – материнская порода

constituent [kən'stitjuənt] – компонент, составная часть

manure [mə'njuə] – навоз

residue ['rezɪdju:] – остаток

humus ['hju:məs] – гумус, перегной

water-holding ['wɔ:tə 'həʊldɪŋ] – влагоудерживающий

aeration [eə'reɪʃən] – аэрация, насыщение кислородом

deplete [dɪ'pli:t] – истощать, исчерпывать

barnyard manure ['bɑ:njɑ:d mə'njuə] – навоз со скотного двора

green manure [gri:n mə'njuə] – зеленое удобрение, сидерат

turn under [tɜ:n 'ʌndə] – запахивать

confront with [kən'frʌnt wɪð] – ставить перед

livestock ['laɪvstɒk] – домашний скот

fertilization [ˌfɜːtɪlaɪˈzeɪʃən] – внесение удобрений
 promote [prəˈməʊt] – способствовать, содействовать; поощрять
 commercial fertilizer [kəˈmɜːʃəl ˈfɜːtɪlaɪzə] – промышленное удобрение
 enrichment [ɪnˈrɪtʃmənt] – обогащение
 class [klaːs] – классифицировать, систематизировать
 complete fertilizer [kəmˈplɪːt ˈfɜːtɪlaɪzə] – полное удобрение
 cover crop [ˈkʌvəkɹɒp] – покровная культура, запашная культура
 plow under [plau ˈʌndə] – запахивать

Exercise 2. Give the Russian equivalents and state the part of the speech of the following words.

Apply, applied, application, consider, considerable, consume, consumption, deplete, depletion, fertilize, fertilization, fertilizer, maintain, maintenance, manure, manuring, decompose, decomposition, decomposed, value, valuing, valuable, vary, various, benefit, beneficial, wide, widen, widely, crop, cropping, cropped, contain, container, contained, progress, progressed, progressing, type, typical, typify.

Exercise 3. Give the Russian equivalents.

Crops are fed to livestock, manure, barnyard manure, green manure, manure is returned to land, depleted, soil is gradually depleted, fertilization, it requires fertilization, fertilizer is applied, manure should be applied, plant residues are turned under, maintenance of soil fertility, commercial fertilizers, complete fertilizer is applied, high water-holding capacity, this soil has a high water-holding capacity, cover crop is practiced, beneficial effects.

Exercise 4. Find the translation for the words in A among those given in B.

A. Plow under, deplete, maintenance, promote, fertilization, apply, remove, residue, consume.

В. Поддержание, запахивать, истощать, способствовать, внесение удобрений, потреблять, вносить, удалять, остаток.

Exercise 5. Translate the international words.

Commercial, problem, effect, organism, container, progress, animalist, constituent, regulator, bacterium, potash, regulate, productivity, humus, directive, director, directress, organic, result.

Exercise 6. Read and translate the following text.

Soil is composed of organic and inorganic material. Inorganic material is obtained from the decomposed parent rock. Organic constituents of the soil are obtained from living and dead plants and animals, plant roots, green manuring crops, manure, crop residues, and bacteria. Soil humus commonly

referred to as organic matter represents the decomposed organic material. If contained in a considerable amount, organic matter influences on soil in many ways. Organic matter supports bacteria and other organisms, improves the physical condition of soil, increases water-holding capacity, improves aeration, regulates soil temperature and serves as an important source of nitrogen and other plant food elements required by plants for their growth.

Much of our land depleted of organic matter, chiefly because of cultivation and erosion, are improved with fertilizing the soil. If used properly, fertilizers can maintain the productivity of our soils. The most important sources of organic matter, however, are barnyard manure and green manure. Long before the modern science appeared the importance of soil organic matter had been recognized by farmers. They found out that when applied to the soil, organic matter increases the soil fertility. So nowadays the progress of agriculture confronts the agronomists with the problems connected with soil fertility.

When grown, the farm crops remove plant food from the soil and decrease the soil fertility. Even when the crops have been fed to livestock and manure has been returned to the land, the soil is gradually depleted and requires fertilization. When applied to the soil, fertilizers promote greater plant growth and better crop quality.

Types of fertilizers. In general there are two types of fertilizers: barnyard manure and commercial fertilizers. Besides, there are the green manure crops and plant residues turned under for soil enrichment.

Farm manures. The value of barnyard manure varies greatly with class of animal, and with the type of feed consumed by the animal. The value of farm manure for maintenance of soil productivity has been always recognized.

Commercial fertilizers. In general applied commercial fertilizers are classed as organic and inorganic. A fertilizer that contains nitrogen, phosphorus and potash is known as a complete fertilizer. Nitrogen, phosphorus and potash mostly consumed by farm crops are the main constituents of plant nutrients. When regularly applied, the complete fertilizers greatly increase the crop yield. If well supplied with organic matter, a soil has a high water holding capacity and a high crop-producing capacity.

Exercise 7. Answer the following questions.

1. What are organic constituents of the soil obtained from? 2. How does the organic matter influence soil? 3. How can the land depleted of organic

matter be improved? 4. What did farmers find out while applying organic matter to the soil? 5. When does the soil gradually deplete and require fertilization? 6. What types of fertilizers do you know? 7. Does the value of barnyard manure always stay the same? 8. What is a complete fertilizer?

Exercise 8. Translate into Russian.

Inorganic material, parent rock, constituent, decomposed material, plants and animals, living and dead organisms, influence in many ways, physical condition, water-holding capacity, soil aeration, soil temperature, source of nitrogen, food elements, depleted land, cultivation and erosion, soil productivity, progress of agriculture, greater growth, crop quality, class of animal, commercial fertilizer, organic and inorganic, crop yield.

Exercise 9. Form the infinitives of the given nouns.

Improvement, application, requirement, germination, sowing, growth, freezing, fertilizer, drainage, maturity, development, moisture, variety, penetration, tillage, thawing, distribution, reference.

Exercise 10. Find the equivalents for the following words and word combinations in the text.

Корни растений, бактерии, разложившийся материал, остатки растений, почвенный гумус, значительное количество, оказывать поддержку бактериям, лучшее качество сельскохозяйственных культур, улучшать условия, элементы необходимые для роста, тип, улучшать плодородие почвы, источник минерального вещества, современная наука, настоящее время, сельскохозяйственные культуры, из-за культивации, промышленные удобрения.

Exercise 11. Complete the sentences using the text and translate the underlined words.

1. If well supplied with organic matter, a
2. A fertilizer that contains nitrogen, phosphorus and potash is
3. ... greater plant growth and better crop quality.
4. When grown, the farm crops remove
5. If used properly, fertilizers can
6. ... represents the decomposed organic material.
7. ... barnyard manure and commercial fertilizers.
8. Inorganic material is obtained from the

Exercise 12. Translate the following sentences into English in a written form.

1. Наш агроном применил новый метод при выращивании овса на песчаных почвах. 2. Удобрения вносятся для улучшения плодородия почвы. 3. Новые технологии выращивания сельскохозяйственных

культур дали высокий урожай. 4. Полеводы нашего хозяйства изучают методы поддержания продуктивности почвы. 5. Запаханный навоз оказывает благотворное действие на текстуру почвы. 6. Ценность навоза со скотного двора определяется типом корма, поедаемого скотом. 7. Внесение промышленных удобрений значительно повышает плодородие почвы.

Exercise 13. Translate the following Participles II as attributes into Russian.

Applied, consumed, got, improved, given, decomposed, maintained, depleted, taken, turned, connected, completed, grown, increased, produced, changed, plowed under, asked, written, done.

Exercise 14. Translate into Russian the following sentences paying attention to the Participle II.

1. The value of barnyard manure varies with the type of feed consumed by the animal. 2. Applied commercial fertilizers greatly increase the productivity of the soil. 3. A green manure crop grown on a farm is turned under for soil improvement. 4. The grown cover crops give several beneficial effects. 5. That method is used for improving the fertility of the soil. 6. The method applied by the agronomist gave good results. 7. Farmers will use the improved system of maintaining the soil fertility. 8. When turned under, green manure crops give several beneficial effects. 9. If grown properly, cover crops are a good for maintaining the soil productivity.

Exercise 15. Read and translate the text.

A green manure crop grown on a farm is turned under for soil improvement. A cover crop is one used to cover and protect the soil surface, especially during winter. Cover crops are commonly plowed under for green manure. Widely practiced green manuring is one of farmer's ancient methods of improving soil.

When turned under, green manure crops give several beneficial effects. The usually given advantages are: (a) to prevent the soil from erosion, (b) to prevent loss of nutrients by leaching from the soil, (c) to improve the structure and water-holding capacity of soils, (d) to increase the nitrogen supply if the manure crop is a legume, (e) to supply organic matter, which upon decomposition releases plant food and indirectly increases the availability of nutrients, (f) to improve the humus content of soil, and (g) to increase the yield and quality of the succeeding crop.

In certain areas the maintenance of the organic matter content and permanent soil fertility has become a critical problem. If grown during

seasons when the land is unoccupied with main crops, green manure crops are a good means of maintaining the soil productivity.

Exercise 16. Answer the following questions.

1. What is a cover crop?
2. How could an ancient farmer improve soil?
3. What kind of beneficial effects does green manure crops give?
4. Where are the green manure crops used as a good means of maintaining soil productivity?

UNIT 7

Crops Seeding

Exercise 1. Read and memorize the following words and word combinations.

prime [praɪm] – важнейший, основной

essential [ɪ'senʃəl] – основа

appearance [ə'piərəns] – появление

variety [və'raɪəti] – сорт

purity ['pjʊərəti] – чистота, беспримесность

caring ['keərɪŋ] – уход

take into consideration [teɪk 'ɪntə kən'sɪdə'reɪʃən] – принимать во внимание

adaptability [ə,dæptə'bɪləti] – приспособляемость

yielding ability ['ji:ldɪŋ ə'bɪləti] – урожайность

resistance [rɪ'zɪstəns] – устойчивость

inferior [ɪn'fɪərɪə] – худший, плохой

yield [ji:ld] – приносить урожай,

guaranty ['gærəntɪ] – гарантия

separate ['sepəreɪt] – отделять, разделять

culture ['kʌltʃə] – культивирование, выращивание

desirable [dɪ'zaɪərəbl] – желательный

broadcast ['brɔ:dkɑ:st] – разбрасывать

inter tillage [ɪn'tɜ:'tɪlɪdʒ] – обработка междурядий

tillage implement ['tɪlɪdʒ'ɪmplɪmənt] – орудие обработки почвы

drill row [drɪl rəʊ] – рядки посева

bearing ['beərɪŋ] – значение

seeding depth [si:dn̩ depθ] – глубина высева

shallow ['ʃæləʊ] – неглубокий

interfering [ɪntə'fɪərɪŋ] – мешающий

rate of seeding [reɪt əv siːdɪŋ] – норма высева

available [ə'veɪləbl] – доступный

insufficient [ˌɪnsə'fɪʃənt] – недостаточный

Exercise 2. Give the Russian equivalents and state the part of the speech of the following words.

Able, ability, inability; adapt, adaptability, adapting; care, caring, careful, carefully; contaminate, contaminated, contaminating; purity, pure, purification; consider, considering, consideration; weed, weeding, weeds, weeded; distribute, distributed, distribution; uniform, uniformity, uniformly; deep, depth; guaranty, guarantor guaranties; favour, favourable, unfavourable; implement, implementation, implements.

Exercise 3. Give the Russian equivalents.

Successful crop production, adaptation, the variety adaptation, the variety adaptation to moisture conditions, low crop yield, take into consideration, take into consideration the seed germination, factors affecting adaptability, yielding ability, disease and insect resistance, inferior, inferior under other conditions, guaranty, there is no guaranty, ability to resist disease and insect attack, varieties varying in their resistance, varieties varying in their disease resistance, have the ability to resist.

Exercise 4. Find the translation for the words in A among those given in B.

A. Purity, resistance, successful, current, attack, approximate, disease, take into consideration, prime, yielding ability, adaptation.

B. Принимать во внимание, приспособление, болезнь, текущий, беспримесность, устойчивость, основной, приблизительный, поражать, успешный, урожайность.

Exercise 5. Translate the international words.

Variation guaranty, universally, labour, qualification, adaptation, maximum, separation, method, culture, real, reason, section.

Exercise 6. Read and translate the following text.

Good seed is a prime essential to successful crop production. The variety adaptation, germination and purity of seed should be known before it is planted. The appearance of weeds in the seed often increases the labour for caring for the crop, reduces crop yields contaminating the current product as well as the seed and soil in future season. Choosing the variety to be used, we should take into consideration the factors affecting the seed qualifications: adaptability, yielding ability, purity, and disease and insect resistance.

Adaptability. It is of first importance that the variety should be adapted to the territory in which it is to be grown. A variety may be excellent under some conditions but inferior under other conditions. The fact that a variety yields well in one region is no guaranty that it will yield well in another region. The same variety, however, may do well in two separated regions.

Yielding ability. It has been shown that before maximum yields can be obtained, a variety must be adapted to the area in which it is to be grown. There is a great variation in the yielding ability of different varieties when grown under the same conditions and given the same methods of culture.

Ability to resist disease and insect attack. Varieties varying greatly in their disease and insect resistance, it is desirable that plants have the ability to resist disease and insect attacks.

Purity. The real value of seed depends upon its purity. It is a well-known fact that seeding practices vary with the kind of crop. Generally speaking, the small grains are sown, broadcast or closely spaced in drill rows. Corn, potatoes and some other crops requiring intertillage are planted in rows far enough apart to permit the passage of tillage implements.

The depth of seeding. The amount of rainfall has an important bearing on the seeding depth. In areas where rainfall is heavy most crops should be seeded comparatively shallow, because the soil surrounding the seeds may remain saturated with water interfering with germination. In dry regions, however, it is necessary to place the seeds deep enough to bring them into contact with soil moisture. The larger the seed, the deeper it can be planted.

The time of seeding has an important bearing on the rate of seeding. So the rate of seeding is determined by a) the fertility of the soil, b) the amount of available moisture in the soil, c) the variety grown. If soils have insufficient water and nutrients for plants, farmers reduce seeding rates.

Exercise 7. Answer the following questions.

1. What should be known before the seed is planted?
2. What factors should be taken into consideration while choosing the variety?
3. Is adaptability very important for a variety to yield well on a chosen territory?
4. Must a variety be adapted to the area to show maximum yields.
5. The disease and insect resistance of a variety varies greatly, doesn't it?
6. Do the seeding practices vary with the kind of crop?
7. What should be kept in mind as for the seeding depth in the areas with heavy rainfall or dry territories?

Exercise 8. Translate the following words and word combinations.

Time of seeding, soil moisture, comparatively, seeding, water interfering with germination, seeding depth, crops requiring intertillage, small grains, resistance, different varieties, qualification, future season, guaranty, tillage implement, the same variety, appearance of weeds, variety adapted to the area, successful crop production, heavy rainfall, adapted to the area.

Exercise 9. Translate the word in brackets.

1. (Существует огромное разнообразие) in the yielding ability of (различных сортов) when grown (в одинаковых условиях). 2. The time of seeding (имеет важное значение) on the rate of seeding. 3. The (земля, окружающая зерна) may remain (насыщенная водой) interfering with germination. 4. (Кукуруза, картофель и некоторые другие культуры) requiring intertillage are planted in rows. 5. The fact that (сорт дает хороший урожай в одном регионе) is no guaranty that it will yield well (в другом регионе). 6. The (адаптация сорта, прорастание и беспримесность) of seed should be known before it is planted.

Exercise 10. Translate the following words and word combinations using the text.

Количество осадков, реальная ценность зерна, работа по уходу, плодородие почвы, всхожесть и беспримесность зерна, актуальный продукт, сокращать урожайность, при выборе сорта, качество зерна, сорт может быть превосходным, максимальный урожай, методы выращивания, растения имеют способность противостоять, орудия обработки, объем присутствующей влаги, обработка междурядий.

Exercise 11. Match the words given in the box with their definitions.

Variety, adaptation, moisture, fertility, rainfall, implement, yield.

- 1) To provide an agricultural product.
- 2) A tool or other piece of equipment that is used for soil tillage.
- 3) The quality of being fertile.
- 4) Tiny drops of water in the air, on a surface, or in the ground.
- 5) A cultivated form of a plant.
- 6) The action or process of adapting or being adapted.
- 7) The quantity of rain falling within a given area in a given time.

Exercise 12. Put the words into the right order.

1. Appearance of weeds, the, reduces, in the seed, crop yields.
2. Should, variety, the, to the territory, be adapted.
3. Variety, the same, do well, may, regions, in two separated.

4. Must, a variety, to the area, be adapted, it grows, where.
5. Value of seed, the real, its purity, depends upon.
6. Practices, seeding, with, vary, crop, the kind of.
7. An important, the amount of, has, rainfall, on the, bearing, seeding depth.

Exercise 13. Complete the following sentences.

1. If soils have insufficient water and
2. The time of seeding has an important
3. Generally speaking, the small grains are
4. The fact that a variety yields well in one region is no guaranty
5. In dry regions, however, it is necessary to place the
6. The variety adaptation, germination and purity
7. Good seed is a prime essential

Exercise 14. Read and translate the text.

Before grain drills were widely used many acres of grain crops were seeded broadcast. Grain drills place the seed at the desired depth and the seed is distributed uniformly over the ground.

The climate and season is important for the rate of seeding so farmers should take into consideration the following recommendations. When winter grains are sown in sections where winters are severe, it is necessary to sow more seed to the acre than in the sections where winters are mild.

The depth at which grains should be seeded will vary with the conditions: the kind of soil, moisture, preparation of the seedbed, and other factors. For example, wheat should be seeded deeper on sandy soil than on clay soil.

Too much water in the soil retards germination and induces rotting of seed in the ground. But all seeds require moisture for germination and plants require water for growth. For this reason different methods of seeding are practiced in soils of different moisture conditions at seeding time.

Seeds of the different grain varieties vary greatly in the adaptability, purity, yielding ability, disease and insect resistance. Choosing the variety for his farm, a farmer should take into consideration the fact that a variety yields well in another region is no guaranty that it will do well in his region.

Exercise 15. Answer the following questions.

1. How do grain drills place the seed into the soil?
2. What should farmers know if they sow in sections where winters are severe?
3. The depth of seeding will vary with the planting conditions, won't it?
4. Why are different methods of seeding practiced in different soil conditions?
5. What should a farmer think of while choosing the variety for his farm?

UNIT 8

Plant Pathology and Epidemiology

Exercise 1. Read and memorize the following words and word combinations.

- plant pathology [ˌplɑːntpəˈθɒlədʒi] – фитопатология
phytopathology [ˌfaɪtəpəˈθɒlədʒi] – фитопатология
pathogen [ˈpæθədʒən] – патогенный, болезнетворный микроорганизм
infectious [ɪnˈfekʃəs] – заразный, инфекционный
fungi [ˈfʌŋgiː, ˈfʌndʒaɪ] – грибки
oomycete [ˌəʊəˈmaɪsiːt] – оомицет
viroid [ˈvaɪrɔɪd] – вириод
virus-like [ˈvaɪərəsleɪk] – вирусоподобный
phytoplasma [ˌfaɪtəˈplæzmə] – фитоплазма
protozoa [ˌprəʊtəˈzəʊə] – простейшие
nematode [ˈnemətəʊd] – нематода
parasitic [ˌpærəˈsɪtɪk] – паразитический, паразитный
etiology [ˌiːtɪˈɒlədʒi] – этиология
epidemiology [ˌepɪˌdiːmɪˈɒlədʒi] – эпидемиология
necroses [nekˈrəʊsiːz] – некрозы, омертвения
protoplast [ˈprəʊtəʊplæst] – протопласт
rot [rɒt] – гниение, разложение
spot [spɒt] – пятнистость (*возбудители – грибы или вирусы*)
wilt [wɪlt] – увядание
hypoplasia [haɪpəˈpleɪziə] – гипоплазия, недоразвитие
hyperplasia [haɪpəˈpleɪziə] – гиперплазия, избыточный рост ткани
chlorosis [klɒˈrəʊsɪs] – хлороз (*заболевание растений, проявляющееся в появлении желтоватой окраски листьев*)
stunting [ˈstʌntɪŋ] – низкорослость
witches' broom [wɪtʃɪzˈbruːm] – ведьмина метла (*возбудитель – гриб Crinipellis perniciosa*)
gall [gɔːl] – галл
spotted [ˈspɒtɪd] – крапчатый, пятнистый
canker [ˈkæŋkə] – язва; червоточина
blight [blaɪt] – губить, загубить
wilt [wɪlt] – вянуть, сохнуть, увядать
diagnostician [ˌdaɪəgnɒsˈtɪʃən] – диагност
diseased [dɪˈziːzd] – болезненный, нездоровый

intensification [ɪnˌtensɪfɪˈkeɪʃən] – обострение

host plant [həʊst plɑːnt] – кормовое растение

thorough [ˈθʌrə] – всесторонний, доскональный

outbreak [ˈaʊtbreɪk] – вспышка

epidemic [ˌepɪˈdemɪk] – эпидемия

susceptible [səˈseptəbl̩] – восприимчивый

monocyclic [ˌmɒnəuˈsaɪklɪk] – моноциклический

polycyclic [ˌpɒliˈsaɪklɪk] – полициклический

crop season [krɒp ˈsiːzən] – вегетационный период

overlapping [ˌəʊvəˈlæp] – перекрывающийся

concatenated [kənˈkætəneɪtɪd] – последовательный, каскадный

severity [sɪˈverəti] – серьезность (*болезни*)

incidence [ˈɪnsɪdəns] – охват, степень

check [tʃek] – контроль

suscept-pathogen-environment triangle [səˈsept ˈpæθədʒən
ɪnˈvaɪərənmənt ˈtraɪæŋɡl̩] – треугольник восприимчивости растения к
болезнетворному микроорганизму в окружающей среде

Exercise 2. Give the Russian equivalents and state the part of the speech of the following words.

Parasitize, parasitized, parasitogenic, parasitophobia; economically, economics, economize, economist; resistant, resist, resistivity, resistless; classify, classic, classically, classicism; expressed, expressible, expressing, expression; identify, identifier, identified, identifying; botanic, botanist, botanize, botany; intensification, intensifier, intensifying, intensely;

Exercise 3. Find the translation for the words in A among those given in B.

A. Pathology, distinction, diagnosis, resistance, destruction, symptom, responsible, overdevelopment, interrelationship, approach, chemical.

B. Отличительный признак, химический, ответственный, симптом, патология, диагноз, сопротивляемость, разрушение, подход, чрезмерное развитие, взаимоотношение.

Exercise 4. Translate the international words.

Organism, virus, etiology, economic, epidemiology, structure, to associate, expression, component, period, aggressive, infection, season, proportion, control, principle, epidemic, cultural, pesticide.

Exercise 5. Give the Russian equivalents.

Infectious organisms, infectious disease, parasitic plants, plant disease, economic impact, major categories, visible manifestations of changes, diseased condition, botanical epidemiologist, components of the disease

triangle, yield loss, infection cycle, maximum amount, concatenated cycle, crop season, below a certain threshold, practicing agriculturist.

Exercise 6. Read and translate the following text.

Plant pathology (also phytopathology) is the scientific study of diseases in plants caused by pathogens (infectious organisms) and environmental conditions (physiological factors). Organisms that cause infectious disease include fungi, oomycetes, bacteria, viruses, viroids, virus-like organisms, phytoplasmas, protozoa, nematodes and parasitic plants. Plant pathology also involves the study of pathogen identification, disease etiology, disease cycles, economic impact, plant disease epidemiology, plant disease resistance, how plant diseases affect humans and animals.

Diseases were first classified on the basis of symptoms. Three major categories of symptoms were recognized long before the causes of disease were known; necroses, destruction of cell protoplasts (rots, spot, wilts); hypoplasia, failure in plant development (chlorosis, stunting); and hyperplasia, overdevelopment in cell number and size (witches' brooms, galls). This scheme remains useful for recognition and diagnosis.

Symptoms are expressions of pathological activity in plants. They are visible manifestations of changes in color, form, and structure: leaves may become spotted, turn yellow and die. Fruits may rot on the plants or in storage, cankers may form on stems and plants may blight and wilt. Diagnosticians learn how to associate certain symptoms with specific diseases, and they use this knowledge in the identification and control of pathogens responsible for the diseases.

It is important to make a distinction between the visible expression of the diseased condition in the plant, the symptom, and the visible manifestation of the agent which is responsible for that condition, the sign. The sign is the structure of the pathogen, and when present it is most helpful in diagnosis of the disease.

Epidemiology is the study of the intensification of disease over time and the spread of disease in space. The botanical epidemiologist is concerned with the interrelationships of the host plant, the pathogen, and the environment, which are the components of the disease triangle. With a thorough knowledge of these components, the outbreak of disease may be forecast in advance, the speed at which the epidemic will intensify may be determined, control measures can be applied at critical periods, and any yield loss to disease can be projected. The maximum amount of disease occurs when the host plant is susceptible, the pathogen is aggressive, and the environment is favorable.

Epidemiologically, there are two main types of diseases: monocyclic, those that have but a single infection cycle (with the rare possibility of a second or even third cycle) per crop season. And polycyclic, those that have many, overlapping, concatenated cycles of infection per crop season. For both epidemiological types, the increase of disease slows as the proportion of disease approaches saturation or 100%.

Control of plant disease is defined as the maintenance of disease severity below a certain threshold, which is determined by economic losses. The principles of plant disease control form the basis for preventing epidemics. However, the practicing agriculturist uses three approaches to the control of plant disease: cultural practices affecting the environmental requirement of the susceptible-pathogen-environment triangle necessary for disease development, disease resistance, and chemical pesticides.

Exercise 7. Answer the following questions.

1. What is plant pathology? 2. What three major categories of symptoms causing diseases do you know? 3. Are symptoms visible manifestations of pathological activity in plants? 4. Is the sign as the structure of the pathogen important for making a diagnosis of a plant disease? 5. What is epidemiology? 6. When does the maximum amount of disease take place? 7. How many types of diseases are there epidemiologically? 8. What is control of plant disease?

Exercise 8. Translate the following words and word combinations.

Scientific study, diseases caused by pathogens, bacteria, viruses, viroids, study of pathogen, disease etiology, destruction of cell, failure in plant development, pathological activity, cankers, blight and wilt, control of pathogens, visible expression, manifestation of the agent, structure of the pathogen, intensification of disease, spread of disease in space, thorough knowledge, overlapping cycles, epidemiological types, development of epidemic, environmental requirement, disease resistance.

Exercise 9. Form the infinitives of the given nouns.

Recognition, classification, requirement, manifestation, intensification, development, destruction, interrelationship, advance, infection, approach. identification, expression, maintenance.

Exercise 10. Find the equivalents for the following words and word combinations in the text.

Условия окружающей среды, оомицет, физиологические факторы, организмы, вирусоподобный, омертвения, диагност, количество и размер, опознание и диагноз, листья могут стать крапчатыми, фрукты могут гнить, полициклический, специфические болезни, вспышка

болезни, критический период, моноциклический, диагноз болезни, меры контроля, предвидеть заблаговременно, кормовое растение, эпидемиологически, основные виды болезней, борьба с болезнями растений, экономические потери, развитие болезни.

Exercise 11. Complete the sentences using the text and translate the underlined words.

1. ... classified on the basis of symptoms.
2. Symptoms are expressions of pathological
3. Diagnosticians use this knowledge in the identification and
4. ... when present it is most helpful in diagnosis of the disease.
5. The maximum amount of disease occurs when the host plant is susceptible, the pathogen
6. For both epidemiological types, the increase of disease slows

Exercise 12. Translate the following sentences into English in a written form.

1. Фитопатология – это наука, которая изучает болезни растений, вызываемые инфекционными организмами и условиями окружающей среды.
2. Существуют три основные категории симптомов, на основе которых определяют причину болезни.
3. Симптомы – это видимые проявления патологической деятельности паразитических организмов в растениях, которые указывают на изменение цвета, формы и структуры.
4. Признак является видимым выражением болезненного состояния растения, пораженного патогеном.
5. Ботанические эпидемиологи изучают взаимодействие между сельскохозяйственной культурой, патогеном и окружающей средой.

Exercise 13. Match the synonyms.

- | | |
|-------------------|-------------------|
| 1. identification | a) previously; |
| 2. disease | b) approach; |
| 3. before | c) vulnerable; |
| 4. knowledge | d) constituent; |
| 5. study | e) determination; |
| 6. component | f) information; |
| 7. susceptible | g) surroundings; |
| 8. single | h) investigation; |
| 9. method | i) illness; |
| 10. conditions | j) particular. |

UNIT 9

Genetically Modified Organisms

Exercise 1. Read and memorize the following words and word combinations.

genetically modified organism [dʒi'netɪklɪ'mɒdɪfaɪd'ɔ:gənɪzəm] – генетически модифицированный организм

DNA [di: en eɪ] – ДНК, дезоксирибонуклеиновая кислота

alter ['ɔ:lʔə] – изменять

unnatural [ʌn'nætʃʔrəl] – неестественный

trait [treɪt] – характерная черта, свойство

crumble ['krʌmbl] – разрушаться

unpredictable [ˌʌnpri'dɪktəbl] – непредсказуемый

modelling clay ['mɒdəlɪŋ kleɪ] – пластилин

mutation [mju:'teɪʃən] – изменение, мутация

genetic engineering [dʒi'netɪkendʒɪ'niʔɪŋ] – генная инженерия

technique [tek'ni:k] – методика, способ

gene mutation [dʒi:n mju:'teɪʃən] – генная мутация

gene insertion [dʒi:n m'sɜ:ʃən] – генная вставка

gene deletion [dʒi:n dɪ'li:ʃən] – удаление гена

selective breeding [sɪ'lektɪv 'bri:dɪŋ] – селекция

transfer ['trænsfɜ:] – перенос

unrelated [ˌʌnrɪ'leɪtɪd] – неродственный

outcome ['autkʌm] – результат

transfer [træns'fɜ:] – переносить

expose [ɪk'spəuz] – подвергать (*воздействию*)

mutagen ['mju:tədʒən] – мутаген

ethyl methanesulfonate ['eθɪl 'mi:θeɪn 'sʌlfə,na:t] – этилметансульфонат

induce [ɪn'dju:s] – вызывать, приводить

release [rɪ'li:s] – вводить в культуру (*в производство*)

unthinkable [ʌn'θɪŋkəbl] – невообразимый, невероятный

endanger [ɪn'deɪndʒə] – подвергать опасности

reassurance [ˌri:ə'ʃʊərəns] – уверение, заверение

conventional [kən'venʃənəl] – обычный, традиционный

carotenoid [kə'rɒtɪnɔɪd] – напоминающий каротин, каротиноид

(*вещество из группы каротиноидов*)

lycopene ['lɪkəʊpi:n] – ликопен

act up [ækt ʌp] – болеть, мучить

get poisoned [get 'pɔɪzənd] – отравиться
 withstand [wɪð'stænd] – выдержать
 potent ['pəʊtənt] – сильнодействующий
 engineered [ˌendʒɪ'nɪəd] – произведенный, разработанный
 resist [rɪ'zɪst] – сопротивляться
 end up [end ʌp] – прийти к ... *чем-л.*
 glycosphat ['glɑɪkəʊsfæt] – гликофат
 protective gear [prə'tektɪv ɡə] – защитное снаряжение
 fetal ['fi:təl] – эмбриональный, зародышевый
 deadly ['dedli] – смертельный, летальный
 wildlife ['waɪldlaɪf] – живая природа
 badly ['bædli] – очень сильно (*придает эмоционально-усилительный оттенок*)

firefly ['faɪəflaɪ] – светлячок
 fancy name ['fænsɪ neɪm] – необычное название
 cut back [kʌt bæk] – урезать, сокращать

Exercise 2. Give the Russian equivalents and state the part of the speech of the following words.

Gene, genetic, genetically; evolve, evolved, evolving, evolutionist; human, humanize, humanitarian, humaneness; chemistry, chemical, chemicalize, chemically; mutate, mutating, mutation, mutated; containing, containment, contain, container; protective, protect, protectionism, protection; generation, generate, generated, generating, generator; production, produce, productive, productivity, produced.

Exercise 3. Find the translation for the words in A among those given in B.

A. Unnatural, crumble, extinct, content, genetic, digestion, engineering, nutritional, lycopene, financial, health, activate, dangerous, cut back.

B. Ликопен, здоровье, активизировать, финансовый, генетический, сыпаться, вымерший, пищевой, сокращать, содержание, пищеварение, инженерный, неестественный, опасный.

Exercise 4. Try to guess the meanings of the following words without a dictionary.

Genetically, organism, result, process, ecosystem, mutation, original, virus, radiation, experiment, idea, tomato, vitamin, financial, toxic, toxin, migrate, potential, problem, industry, company, evolutionary,

Exercise 5. Read and translate the following text.

(GMO) stands for a genetically modified organism and refers to any living organism whose DNA has been altered in an unnatural way, in view of displaying traits that would not have otherwise developed as a result of a

normal evolutionary process. Altering DNA is like taking a card from a card house: in the end, either it stands tall, or crumbles to the ground. Genetically modified foods can have an unpredictable effect on human and ecosystem health. It's like when a kid adds a bit of blue to his yellow modelling clay: it will never be the same color again.

Genetic mutations are obtained through genetic engineering techniques such as gene mutation, gene insertion or gene deletion. Unlike selective breeding, this is an unnatural process because the transfer of genes occurs between completely unrelated species and outcomes cannot be fully predicted even by those carrying out the process. Genetic engineering modifies existing plants so they become different from the original. When you transfer a virus gene into the corn DNA to make it resistant to a certain herbicides or expose seeds to radiation, it becomes evident how good things can get or use chemical mutagens such as ethyl methanesulfonate (EMS) to induce mutations in food crops. Then you release food crops that may alter human DNA over time and possibly generate unthinkable mutation processes that may endanger human and ecosystem health.

Genetical engineers perform experiments with bacteria, animal, plant genes to make things look prettier so they sell better. But inside GMO foods is something new we have no idea how it will impact us. Despite reassurances from the part of producers that we can eat GMO foods safely, not even they know how these foods will leave their mark on us 10 years from now. Why are GMOs dangerous? Here is what science has to say about the dangers of GMOs:

GMOs don't have the same nutritional content as conventional species. By altering the DNA of a tomato, let's say, and making it yellow instead of red, we might get a tomato with a good vitamin A and carotenoid content, but containing less or almost no lycopene. There is no way of knowing how a genetically modified food can affect us. Maybe a gene taken from a certain bacteria activates after years of consuming the same GM food. Maybe the mutation induced in a certain food acts up in our body as well. Maybe we slowly get poisoned due to the fact that plants are engineered to withstand massive use of potent herbicides.

GMOs are toxic. Genetically engineered seeds are made to resist the massive use of herbicides and even produce an insecticide themselves. Therefore, we end up eating a plant whose seed is resistant to the herbicide glyphosate. The people who perform spraying have to wear protective gear from head to toe to avoid inhaling the toxins. GMOs slowly change us. Of the little research conducted up to this point, it has been revealed that the modified genes from GMO food crops are not destroyed during digestion,

but remain in the brain of newborn mice. Recent research also shows that toxins from GM foods migrate into the fetal blood, putting even future generations at risk for potentially grave health problems.

They are deadly for wildlife and damage the ecosystem badly. Billions of bees have died. And fireflies are almost extinct. We depend on insects such as bees for pollination so what will we eat if they all die? GMOs are a just a fancy name for crops with the aim of providing good annual yields. The food industry relies heavily on them to cut back on production costs and time, but is simultaneously risking our health by altering plant DNA for the purpose of generating prompt mutations to the companies' financial benefit.

Exercise 6. Answer the following questions.

1. What is a genetically modified organism?
2. How are genetic mutations obtained?
3. What happens when you transfer a virus gene into the corn DNA?
4. Why do genetical engineers perform experiments with bacteria, animal, plant genes?
5. Is the nutritional content of GMOs the same as that of conventional species?
6. Do we know how a genetically modified food can affect people?
7. Do modified genes from GMO food crops affect human bodies?
8. Are GMOs deadly for wildlife and our ecosystem?
9. Good annual yields are very important for food industry, aren't they?

Exercise 7. Translate the following words and word combinations into Russian.

Genetically modified organism, alter DNA, display traits, normal evolutionary process, card house, have an unpredictable effect, transfer a virus gene, expose seeds to radiation, chemical mutagen, induce mutations in food crops, unthinkable mutation process, avoid inhaling the toxins, a conventional species, wear protective gear, from head to toe, damage wildlife and ecosystem, good annual yield, food industry, production costs, generate prompt mutation, certain bacteria, eat GMO foods safely, ethyl methanesulfonate.

Exercise 8. Choose the correct word in each sentence printed in italics. Use the text if necessary.

1. Altering DNA is like taking a (*gene / card / brick*) from a card house.
2. Genetic mutations are obtained through (*genetic / generic / mechanic*) engineering techniques.
3. Genetic engineering modifies existing (*costs / plants / facts*) so they become different from the original.

4. GMOs are a just a fancy (*bread / dress / name*) for crops with the aim of providing good annual yields.

5. Maybe a gene taken from a certain (*bacilli / bacteria / microbes*), activates after years of consuming the same GM food.

Exercise 9. Choose the right translation for the underlined part of the sentence.

1. Genetically modified foods can have an unpredictable effect on human and ecosystem health.

- a) может иметь непредсказуемый эффект;
- b) могут иметь непредсказуемое воздействие.

2. But inside GMO foods is something new we have no idea how it will impact us.

- a) не имеем идеи, как это повлияет на нас;
- b) не имеем представления о том, как оно повлияет на нас.

3. Maybe we slowly get poisoned due to the fact that plants are engineered to withstand massive use of potent herbicides.

- a) устоять перед массовым использованием мощных гербицидов;
- b) выдерживать массированное применение сильнодействующих гербицидов.

4. We depend on insects such as bees for pollination so what will we eat if they all die?

- a) что мы будем есть, если они все умрут;
- b) чем мы будем наедаться, если они все умрут.

5. Therefore, we end up eating a plant whose seed is resistant to the herbicide glycosphat.

- a) семечко устойчиво к гербициду гликофату;
- b) семена устойчивы к гербициду гликофату.

Exercise 10. Match the following words with their definition.

- | | |
|--------------|---|
| 1) food | a) substance that people or animals eat or drink. |
| 2) mutation | b) the changing of the structure of a gene. |
| 3) radiation | c) electromagnetic waves that cause ionization. |
| 4) bacteria | d) tiny organisms that can cause disease. |
| 5) herbicide | e) a chemical used to destroy weeds. |
| 6) seed | f) unit of reproduction of a flowering plant. |
| 7) damage | g) physical harm that is caused to an object. |
| 8) benefit | h) an advantage or profit gained from something. |
| 9) technique | i) a way of carrying out a particular task. |
| 10) crops | j) plants grown in large quantities for food. |

Exercise 11. Translate the following words and word combinations into English.

Изменить неестественным образом, разрушаться до основания, генная мутация, совершенно неродственные виды, химический мутаген, перенос генов, генная инженерия, проводить эксперимент, несмотря на заверения, генетически модифицированная пища, проводить исследование, модифицированные гены, разрушаться во время пищеварения, токсин, серьезные проблемы со здоровьем, произвести быструю мутацию, производить опрыскивание, вдыхание токсинов, дикая природа и экосистема, изменить ДНК человека, генный инженер, опыление, одновременно, содержание каротиноида, ДНК кукурузы.

Exercise 12. Translate the following sentences into English.

1. Ученые утверждают что, ГМ продукты перемещаются в кровь плода, подвергая риску будущие поколения людей.
2. Следовательно, мы приходим к тому, что вредители-насекомые не погибают от гербицидов.
3. Пищевая отрасль сильно зависит от высоких урожаев сельскохозяйственных культур.
4. Изменение ДНК растения может вызвать непредсказуемые последствия в растениеводстве.
5. Исследователи не могут сказать, как ГМ продукты повлияют на нас через 10 лет.

UNIT 10

Organic Farming

Exercise 1. Read and memorize the following words and word combinations.

organic farming [ɔ:'gænik 'fɑ:mɪŋ] – органическое земледелие
plant growth regulator [plɑ:nt grəʊθ 'regjuleɪtə] – регулятор роста растений
feed additive [fi:d 'ædɪtɪv] – кормовая добавка
nourish ['nʌrɪʃ] – удобрять, подпитывать
biofertilizer [baɪo 'fɜ:təlaɪzər] – биоудобрение
beneficial [benɪ 'fɪʃəl] – благотворный
Food and Agriculture Organization [fu:dənd 'ægrɪkʌltʃə, ɔ:'gənəɪ'zeɪʃən] – Продовольственная и сельскохозяйственная организация

contend [kən'tend] – утверждать
 holistic [həu'listɪk] – целостный,
 health [helθ] – благополучие, жизнеспособность
 accomplish [ə'kɒmplɪʃ] – достигать
 as opposed to [æz ə'pəʊzd tu] – в отличие от
 innumerable [ɪ'nju:mərəbl] – бесчисленный
 sustainability [sə,steɪnə'bɪləti] – устойчивое развитие
 soil-binding technique [sɔɪl'baɪndɪŋ tek'ni:k] – почвозащитный метод
 crop-rotation [krɒp rəu'teɪʃn] – севооборот, чередование культур
 inter-cropping [ɪntə'krɒpɪŋ] – междурядное размещение культур
 symbiotic association [ˌsɪmbaɪ'ɒtɪk ə,səʊsɪ'eɪʃən] – симбиотическая
 ассоциация
 enhance [ɪn'hɑ:ns] – увеличивать
 cover crop ['kʌvə krɒp] – запахная культура
 minimum tillage ['mɪnɪmə 'tɪlɪdʒ] – минимальная обработка почвы
 retentive ability [rɪ'tentɪv ə'bɪləti] – удерживающая способность
 combat ['kɒmbæt] – бороться
 soil erosion [sɔɪl rɪ'əʊzən] – почвенная эрозия
 soil compaction [sɔɪl kəm'pækʃn] – уплотнение почвы
 soil salinization [sɔɪl sælɪnaɪ'zeɪʃn] – засоление (*почв*)
 end up [end ʌp] – попадать
 water body ['wɔ:tə 'bɒdi] – водоем
 compost ['kɒmpɒst] – компост, составное удобрение
 animal manure [ˌænɪməl mə'njuə] – навоз
 green manure [gri:n mə'njuə] – зеленое удобрение, сидерат
 water infiltration ['wɔ:tə ɪnflɪ'treɪʃn] – просачивание воды
 restorative capability [rɪ'stɒrətɪv ˌkeɪpə'bɪləti] – восстановительный
 потенциал
 labor input ['leɪbə 'ɪnpʊt] – трудоемкость, трудовложение
 application [ˌæplɪ'keɪʃən] – вид обработки
 enhancement [ɪn'hɑ:nsmənt] – улучшение, оздоровление
 mulch [mʌlʃ] – мульча (*перегной, солома, защищающие почву от испарения, замерзания*)
 garlic oil ['gɑ:lɪk ɔɪl] – чесночное масло
 clove oil [kləʊv ɔɪl] – гвоздичное масло
 corn gluten meal [kɔ:n 'glu:tən mi:l] – кукурузно-глюиновая мука
 borax ['bɔ:ræks] – бура
 break down ['breɪk'daʊn] – разлагать(ся)
 vigorous ['vɪgərəs] – сильный, энергичный

predatory ['predətəri] – хищный
beneficial [ˌbenɪ'fɪʃəl] – полезный
pollination [ˌpɒlə'neɪʃən] – опыление
benefits ['benɪfɪts] – благоприятные преимущества
complementary [ˌkɒmplɪ'mentəri] – дополнительный
cumulative [ˈkju:mjələtɪv] – накопительный

Exercise 2. Find the translation for the words in A among those given in B.

A. Growth, namely, biodiversity, formation, groundwater, degradation, without, cycle, weeding, technology, conservation, vigorous, enhancement.

B. Цикл, грунтовая вода, повышение, сохранение, прополка, без, сильный, формирование, вырождение, биологическое разнообразие, а именно, рост, технология.

Exercise 3. Give the Russian equivalents and state the part of the speech of the following words.

Ecological, ecologically, ecology; biologic, biologically, biologist, biologize; regulate, regulation, regulated, regulating; associate, associated, associating; structured, structuredness, structureless, structuring; pollute, polluted, polluter, polluting; mechanic, mechanically, mechanicalness, mechanics; science, sciential, scientifically, scientist; nutritional, nutrition, nutritionist, nutritive; apply, applicative, application, applicator; power, powerless, powerfully; protect, protectee, protecting, protected.

Exercise 4. Try to guess the meanings of the following words without a dictionary.

Organic, form, pesticide, herbicide, organism, regulator, microbe, system, technique, association, minimum, formation, mineral, compensate, erosion, degradation, chemical, synthetic, compost, structure, infiltration, mechanical, practice, selection, technology, traditional, natural, control.

Exercise 5. Read and translate the following text.

Organic farming or ecological agriculture is a form of agriculture, which avoids the use of synthetic fertilizers, pesticides, herbicides, and genetically modified organisms, plant growth regulators and livestock feed additives. The soil is nourished with biofertilizers namely beneficial microbes and efficient use of organic wastes.

The Food and Agriculture Organization contends that “Organic agriculture is a holistic production management system which enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfill any specific function within the system”.

There are innumerable benefits of organic farming, first among them being sustainability. Organic farming employs soil-binding techniques through crop-rotations, inter-cropping, symbiotic associations, use of cover crops, and minimum tillage. It improves soil formation, enhances nutrients, increases retentive abilities for minerals, and compensates for no use of mineral fertilizers. In fact, these techniques help combat soil erosion, compaction, salinization, and other forms of degradation.

Agriculture often becomes a source of water pollution due to washing away of chemical and synthetic fertilizers which ends up in water bodies. Nevertheless, in case of organic farming, they are replaced by organic fertilizers such as compost, animal manure, and green manure. It also helps enhance soil structure and water infiltration. Such greater use of biodiversity reduces the risk of groundwater pollution and has restorative capabilities.

Organic farming demands greater labor input than conventional agriculture. Farmers clear the weeds, without using any mechanical and chemical applications. Organic farming relies on practices like hand weeding and enhancement of soil with mulch, garlic and clove oil, corn gluten meal, table salt and borax, to get rid of weeds and insects, while ensuring crop quality.

Organic farming methods combine scientific knowledge and modern technology with traditional farming practices based on thousands of years of agriculture. Organic farming relies heavily on the natural break down of organic matter, using techniques like green manure and composting, to maintain nutrients taken from the soil by the previous crops.

In chemical farming a specific insecticides may be applied to quickly kill off a particular insect pest. Organic farming encourages rapid natural selection of resistant insects, plants and other organisms, necessitating increased use of more powerful control measures. Organic methods help generate a vigorous population of soil-microorganisms.

Organic pest control involves techniques like encouraging predatory beneficial insects, microorganisms and careful crop selection. Each of these techniques also provides other benefits: soil protection, fertilization, pollination, water conservation etc. These benefits are both complementary and cumulative in overall effect on farm health.

Exercise 6. Answer the following questions.

1. What is organic farming?
2. What is the argument of the Food and Agriculture Organization in favour of organic agriculture?

3. What techniques are employed in organic farming?
4. Are synthetic fertilizers replaced by organic ones in case of ecological agriculture?
5. What practices does organic farming rely on?
6. Are organic farming methods combined with traditional farming practices?
7. Are synthetic pesticides used to control pests under organic farming?

Exercise 7. Translate the words and word combination in brackets into English.

1. (Почва удобряется) with biofertilizers namely (благодетельными микроорганизмами) and efficient use of (органических отходов).

2. It (улучшает формирование почвы), enhances nutrients, increases retentive abilities for minerals, and (компенсирует неприменение минеральных удобрений).

3. (Тем не менее), in case of organic farming, they (замещаются органическими удобрениями) such as compost, (животный навоз и зеленое удобрение).

4. (В традиционном сельском хозяйстве) a specific insecticides may be applied to quickly (уничтожить определенное вредное насекомое).

5. (Эти благоприятные результаты) are both complementary and cumulative (по всеобщему влиянию на состояние фермы).

Exercise 8. Translate the following words and word combinations into English.

Экологическое сельское хозяйство, избегать использовать искусственное удобрение, генетически модифицированный организм, регулятор роста растения, кормовая добавка для скота, благотворная микроба, бесчисленные благоприятные преимущества, междурядное размещение культур, минимальная обработка почвы, увеличивать количество питательных веществ, удерживающая способность, бороться с засолением, трудовложение, вид обработки, избавиться от насекомого, особый инсектицид, быстрый естественный отбор, мощные меры контроля, популяция почвенных микроорганизмов.

Exercise 9. Translate the following sentences.

1. Органическое земледелие – это такой вид сельского хозяйства, в котором не используются искусственные удобрения, пестициды и гербициды. 2. Органическое земледелие улучшает процесс формирования почвы, используя агрономические, биологические и механические методы. 3. Применение компоста, животного навоза и зеленого удобрения снижает риск загрязнения грунтовых вод. 4. Меры

борьбы с вредителями включают стимулирование быстрого размножения хищных полезных насекомых, микроорганизмов и тщательную селекцию сельскохозяйственных культур.

Exercise 10. Translate the following words and word combinations into Russian.

Hand weeding, organic agriculture, enhance soil with mulch, biological cycles, soil biological activity, synthetic material, fulfill a specific function, chemical and synthetic fertilizers, water body, enhance water infiltration, great use of biodiversity, combine scientific knowledge and modern technology, fertilization, traditional farming practice, natural break down, pollination, previous crop, organic pest control, soil protection, water conservation, complementary and cumulative effect.

Exercise 11. Make up word combinations using the text and translate them.

- | | |
|-------------------|---------------------------|
| 1) source | a) health; |
| 2) agro-ecosystem | b) of water pollution; |
| 3) soil | c) any specific function; |
| 4) fulfill | d) biological activity; |
| 5) combat | e) weeds and insects; |
| 6) get rid of | f) soil erosion; |
| 7) enhance | g) pest control; |
| 8) organic | h) soil structure; |
| 9) combine | i) crop selection |
| 10) careful | j) scientific knowledge. |

Exercise 12. Match the synonyms.

- | | |
|------------------|------------------|
| 1) agriculture | a) farming; |
| 2) contend | b) assert; |
| 3) technique | c) method; |
| 4) deterioration | d) degradation; |
| 5) synthetic | e) artificial; |
| 6) infiltration | f) percolation; |
| 7) conventional | g) traditional; |
| 8) modern | h) contemporary; |
| 9) knowledge | i) erudition; |
| 10) pest | j) vermin. |

Supplementary Reading

Text 1

chloroplast ['klɔ:rəʊ,plæst] – хлоропласт
palisade [ˌpælɪ'seɪd] – столбчатый, палисадный
stomata [stəʊ'mɑ:tə] (мн. число от stoma ['stəʊmə]) – устьице, стома
bundle ['bʌndl] – пучок, тяж
petiole ['petrəʊl] – черешок, стебелек
midrib ['mɪdrɪb] – главная жилка
vein [veɪn] – жилка

The cell. A cell is the simplest and the elementary structural unit of the plant body. The combination of various kinds of cells forms different kinds of organs which in turn combine to make up the plant body. Each plant cell possesses a wall of cellulose, which is the basis structure unit. Contained within the cell wall is the protoplasm, the living portion of the plant. Protoplasm in a sense is life, and is a complex jelly-like colloidal material. Mineral substances, carbohydrates, fats, proteins and water are important and necessary constituents of protoplasm. All the life processes of the plant are initiated and controlled by the protoplasm. Reproduction is also centered within the protoplasm in the nucleus.

The leaf. The leaf is the main manufacturing centre for the plant food materials. Simple sugars are fabricated by the process of photosynthesis. The chloroplasts in the palisade cells of the leaf contain chlorophyll, the green pigment necessary for this reaction. Chlorophyll is a complex compound which contains nitrogen and magnesium in addition to carbon hydrogen and oxygen.

To permit the essential exchange of gases, the leaf has small pores on its surfaces, sometimes both upper and lower, sometimes only on the lower, depending upon the species. These pores are called stomata, and are capable of opening and closing. To provide space for gas within the leaf tissue various air sacs or "empty spaces" connect the stomata with the palisade cells. Conducting bundles are contained in the leaf blade and in its petiole which is attached to the stem. These tissues are extensions of the vascular cells of the stem.

They form the midrib and the veins of the leaf. These vascular units transport the manufactured foods from the leaf and carry water and minerals into it.

Text 2

anchoring ['æŋkərɪŋ] – фиксирование, скрепление, укрепление

substrate ['sʌbstreɪt] – нижний слой, подслон

osmosis [ɒz'məʊsɪs] – осмос

root hair [ru:t heə] – корневой волосок

diffuse [dɪ'fju:s] – распространять

uptake ['ʌpteɪk] – потребление, поглощение

xylem['zaɪləm] – ксилема

phloem ['fləʊem] – флоэма, луб

The root. Roots serve as the means of anchoring or supporting the plant in its growing substrate. If the substrate is not dense enough, the roots are not in a position to supply support. Thus, from a strictly functional viewpoint, the job of plant support by the roots is secondary.

Certain physiological functions appear to be the primary work of the root system. It absorbs water by the process of osmosis through the root hairs. Likewise, necessary mineral elements diffuse through the root hairs. These two functions are dependent upon the rate of oxygen uptake by the roots and by the rate of respiration of the root cells.

Besides the function of water and mineral nutrient ion uptake, certain metabolic actions occur in the root tissue. In some plants practically all of the nitrogen assimilation occurs in the young root cells; protein synthesis also goes on in the roots of some plants. Many roots serve as storage organs and this function is highly specialized in some crops, such as carrots, sweet potatoes and asparagus.

To permit the flow of water and nutrient ions from the absorptive tissues to the stem, specialized internal organs are present. The xylem vessels permit the flow of these substances to similar structures in the stem. The downward flow of elaborated food materials from the leaves and stems to the absorptive and growing regions of the root moves through the phloem tubes. Thus, the root supplies water and mineral nutrients to the aerial portion of the plant and in turn receives necessary foods for its own life processes.

Text 3

apical ['æpɪk(ə)] – апикальный, верхушечный

meristem ['merɪstəm] – меристема

xylem ['zɪləm] – ксилема
 monocotyledon [ˌmɒnəkɒtɪ'li:d(ə)n] – односемядольное растение
 dicotyledon [ˌdaɪkɒtɪ'li:d(ə)n] – двудольное растение
 strand – тяж, цепь, нить
 fibrovascular [ˌfaɪbrəʊ'væskjələ] – сосудисто-волокнистый
 sheath [ʃi:θ] – обертка, оболочка
 bounded ['baʊndɪd] – ограниченный
 pith – мякоть, рыхлая сердцевина
 cambium ['kæmbiəm] – камбий

The stem. The stem is chiefly a medium of support and condition for the plant. It holds the leaves up to permit them to be exposed to the necessary sunlight. Phloem tubes transport food materials, manufactured in the leaves, to the roots and the growing points of the stems. Likewise, water and minerals travel from the roots to the leaves and apical meristems through the xylem vessels of the stem.

The location of these conducting tissues within the stem is dependent upon the type of plant. Seed-bearing plants may be divided into two groups, the monocotyledon and dicotyledon. The monocotyledons contain the phloem and xylem tissues in a compact strand called a fibrovascular bundle. Phloem faces toward the outside of the stem and xylem toward the inside. These bundles are placed in concentric rings within the stem tissues. Corn is a typical monocotyledon plant.

Dicotyledon plants contain an internal sheath of xylem cells, which are bounded internally by the pith cells and externally by the cambium cells. The xylem tissue forms a continuous sheath around the stem. Next to the cambium tissue lie the phloem cells, which also form a continuous sheath around the stem. The cambium between these two conducting regions produced new xylem and phloem cells as the plant grows. Tomato is a representative type of dicotyledon.

Text 4

leaflet ['li:flət] – листок, листочек
 sepal ['sepəl] – чашелистик
 calyx ['keɪlɪks] – чашечка
 petal ['pet(ə)l] – лепесток
 corolla [kə'rɒlə] – венчик
 ovary ['əʊv(ə)rɪ] – завязь

pod [pɒd] – стручок
 pistil ['pɪstɪl] – пестик
 stigma ['stɪgmə] – рыльце
 receptive [rɪ'septɪv] – рецептивный
 pollen grain ['pɒlən greɪn] – пыльцевое зерно
 alight [ə'laɪt] – садиться
 stamen ['steɪmən] – тычинка
 propulsion [prə'pʌlʃ(ə)n] – пропульсия, движущая сила
 anther ['ænθə] – пыльник
 monoecious [mɒ'niːʃəs] – однодомный
 dioecious [daɪ'iːʃəs] – двудомный

The flower. The flower is the reproductive part of the plant. Seed production is dependent upon proper functioning of the various organs of the flower.

At the base of the flower are green leaflets called sepals, these are collectively known as the calyx. The colored petals form the corolla, which is the decorative part of the flower. At the base of the calyx and the corolla is found the ovary. This female organ develops into the future seed pod or fruit. A slender tube arises from the ovary to form the pistil. At the upper end of the pistil is located the stigma, which is the female receptive organ. The surface of the stigma contains a sticky substance which retains the pollen grain when it alights upon the stigma. Usually placed around the pistil are the stamens.

Depending upon environmental conditions and the species of plant, the pollen is transferred to the stigmatic surfaces of the pistils by means of insects, wind, rain, initial propulsion from the anthers or pollen sacs, and by various other means.

Three general types of flowers are found in green plants. The perfect flower contains both female and male parts on the same flower. Thus, self-pollination as well as crosspollination is possible; tomato and rose are typical examples. Imperfect flowers for the present purpose may be classified into two general sub-types. Monoecious plants contain separate female and male flowers in the same plant, such as cucumber. Dioecious plants contain separate female and male flowers on separate plants as in asparagus.

Text 5

sod crop [sɒd krɒp] – дерновые культуры

inoculate [ɪ'nɒkjuleɪt] – прививать

intersperse [ˌɪntə'spɜːs] – разнообразить

stubble ['stʌbl] – стерня

The Crop Rotation. One of the methods of maintaining fertility is to follow a definite cropping program. A crop rotation may be defined as a planned sequence of crops grown in recurring succession on the same area of land. In short, provision is made for the growing of different crops rather than the continuous culture of one crop, a scheme that is now limited to relatively few crops.

Many advantages may be given for the use of a properly planned crop rotation scheme. Among these are the following:

1. Different crops require different amounts of plant nutrients. A diversity of crops is of value in the maintenance of fertility, since the drain is not so great on any one nutrient.

2. The use of a cultivated crop in the rotation aids in weed, insect, and disease control. Without a rotation, weedy plants, insects, and diseases tend to become more numerous, since there is less check to their continued increase in population.

3. The ground of legumes in the rotation helps to increase the nitrogen content of the soil, as properly inoculated legumes take nitrogen from the air.

4. Rotations that include sod crops aid in the control of erosion. The sod greatly slows the movement of water and may be interspersed with cultivated areas to prevent erosion.

5. Crop residues may be returned to the soil to aid in the maintenance of organic matter. It is desirable that straw produced on the farm be returned in the manures. Stubble and other crop residue may be plowed under to advantage on most farms.

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