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АНГЛИЙСКИЙ ЯЗЫК. ТЕКСТЫ ДЛЯ ЧТЕНИЯ И ОБСУЖДЕНИЯ

Практическое руководство

для студентов 2 курса
специальности 1-33 01 02 «Геоэкология»

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Данное пособие предназначено для обучения студентов 2 курса геолого-географического факультета различным видам чтения и перевода профессиональных текстов, владение которыми необходимо будущим специалистам, а также формирования устной речи, переводческих навыков. Эффективное практическое овладение языком обеспечивается системой языковых упражнений.

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Введение

Практическое руководство предназначено для чтения на английском языке и перевода на родной язык для студентов неязыковых специальностей. Предлагаемые аутентичные тексты отвечают динамике современного научно-технического прогресса, а также требованиям программы по английскому языку для студентов высших учебных заведений.

Практическое руководство предназначено для обучения студентов различным видам чтения профессиональных текстов, владение которыми необходимо будущим специалистам, а также для формирования устной речи, переводческих навыков. Помимо этого, руководство может быть использовано при работе в группах магистрантов для развития навыков чтения и говорения по теме «Моя научная деятельность».

Целью руководства является развитие коммуникативных умений и навыков различных видов речевой деятельности, а также навыков реферирования специальной литературы.

Пособие состоит из 15 разделов, каждый из которых включает ряд упражнений для развития лексико-грамматических навыков чтения и перевода. Оригинальные тексты по темам разделов, а также упражнения, входящие в настоящее практическое руководство, отвечают принципам современной коммуникативной методики.

При отборе текстов внимание было уделено тому, чтобы каждый текст носил профессиональный характер и был насыщен лексикой, связанной с профессиональной деятельностью будущих специалистов в области геоэкологии.

Активный лексический минимум определяется темами пособия.

Unit 1
ON THE OPPOSITE END OF EARTH

Ex. 1 Read the text

Antarctica, which covers the geographic South Pole, is itself covered with thick ice sheets. The average ice thickness is about 1.5 miles with some parts reaching as deep as three miles. Antarctica's ice shelves are also melting, for the same reasons associated with the melting of the Arctic Ice Cap, but not as dramatic. The melting of the Antarctic ice shelves has resulted in the calving of some of the largest icebergs ever known to exist, such as the series of icebergs that broke off from the Ross Ice Shelf in the spring and summer of 2000. But dramatic melting of Antarctic ice would have enormous impacts on ecosystems, climate and sea levels.

Icebergs result from a melting of the Antarctic ice shelves and the Arctic Ice Cap. While the Arctic icebergs are normally taller, the Antarctic icebergs are much larger and more massive.

Did you know...?

Hot springs and active volcanoes have recently been discovered far beneath the Arctic Ice Cap in the Arctic Ocean. While the enormous heat and energy from this activity are insignificant contributors to the increase in ocean temperatures, they appear to be an oasis for newly discovered species of plants and animals.

Antarctica is colder than the Arctic even though during the course of the year it receives almost the same amount of sunlight. In fact, Antarctica receives a little more solar energy than the Arctic because the Earth is closest to the sun in December when Antarctica has 24 hours of sunlight.

The Arctic is the northern pathway that water travels between the Atlantic and Pacific oceans.

The greenhouse effect maintains Earth's average temperature at approximately 60 °F. Without the greenhouse effect, the temperatures on Earth would be so cold that life could not exist.

Sea ice is almost all-fresh water, with some salt trapped within it. The salt is actually not part of the ice, but just got caught up in the freezing process.

The Arctic's ice is, at most, only a few feet thick with water under it. While the water would be anything but warm if you jumped into it, it is at least around 30 °F, its salt water stays liquid at a lower temperature than fresh water.

Useful vocabulary:
ice sheets – слои льда;
thickness – толщина;
break off from – отколоться от;
impact – влияние;
heat – жара;
insignificant – незначительный;
pathway – путь, тропа;
maintain – поддерживать;
approximately – приблизительно
exist – существовать.

Ex. 2 Answer the following questions

1 Antarctica covers the geographic South Pole, doesn't it?
2 How much is the average ice thickness?
3 Why are Antarctica's ice shelves melting?
4 What would dramatic melting of Antarctic ice have enormous impacts on?
5 What do icebergs result from?
6 What has recently been discovered far beneath the Arctic Ice Cap in the Arctic Ocean?
7 Antarctica is colder than the Arctic, isn't it?
8 What is the northern pathway that water travels between the Atlantic and Pacific oceans?
9 What maintains Earth's average temperature at approximately 60 °F?
10 Sea ice is almost all-fresh water, isn't it?

Ex. 3 Translate the sentences from the text

1 The melting of the Antarctic ice shelves has resulted in the calving of some of the largest icebergs ever known to exist.
2 While the Arctic icebergs are normally taller, the Antarctic icebergs are much larger and more massive.

3 The enormous heat and energy from this activity are insignificant contributors to the increase in ocean temperatures.

4 Antarctica receives a little more solar energy than the Arctic.

5 The Arctic is the northern pathway that water travels between the Atlantic and Pacific oceans.

6 Without the greenhouse effect, the temperatures on Earth would be so cold that life could not exist.

7 The salt is actually not part of the ice, but just got caught up in the freezing process.

Ex. 6 Retell the text.

Unit 2
500 YEARS PLAN

Ex. 1 Read the text

The goal of work at Earth Sanctuary is to combine ecological science, landscape design, and environmental art. The design process is called the «500 Years Plan» to acknowledge that the ecological communities of the Earth Sanctuary will take hundreds of years to recover from past land use practices and develop into their fullest expression as a diverse and mature ecosystem. Also, the «500 Years Plan» acknowledges the human commitment necessary to preserve, protect, and restore the Earth Sanctuary landscape over the long term. This commitment is being accomplished through the development of land conservation covenants and the design and implementation of a phased landscape and restoration plan.

The details of the «500 Years Plan» are described in an extensive report. This 100-page document presents the Earth Sanctuary's ecological design process in four sections:

– the Earth Sanctuary landscape and land use history;

– the process of delineating and mapping the environmental regulatory landscape, including wetlands, streams, and ponds;

– an overview of the vegetation, wildlife, and fish surveys we have conducted – the scientific basis for the ecological design;

– the landscape and restoration design projects.

In addition, the plan includes extensive appendices detailing high tech survey techniques, wetland, wildlife, and fish studies, and plant lists. The «500 Years Plan» was prepared by wetland and river ecologist Kevin Fetherston.

It incorporates contributions on wetlands and vegetation by Scott D. Miller, on wildlife by Kathryn Kelsey, and on fish by Ann Garrett.

It is hoped that the «500 Years Plan» can serve as an inspiration and model for future developers and ecologists.

It is a real-life project that holistically integrates the best in ecological study with landscape design, environmental art, and traditional earth energy studies.

Useful vocabulary:
landscape – ландшафт;
acknowledge – сознавать, допускать;
recover from – выздороветь, поправиться;
expression – выражение;
diverse – различный;
preserve – сохранять;
implementation – выполнение;
restoration – восстановление;
delineating – набросок;
mapping – нанесение на карту.

Ex. 2 Answer the following questions

1 What is the goal of work at Earth Sanctuary?

2 How is the design process called?

3 The «500 Years Plan» acknowledges the human commitment necessary to preserve, protect, and restore the Earth, doesn't it?

4 Where are the details of the «500 Years Plan» described?

5 What does the plan also include?

6 Who prepared the «500 Years Plan»?

7 What does the «500 Years Plan» incorporate?

8 The «500 Years Plan» can serve as an inspiration and model for future developers and ecologists, can't it?

9 Is it a real-life project?

10 Does it integrate the best in ecological study with landscape design, environmental art, and traditional earth energy studies?

Ex. 3 Translate the sentences from the text.

1 The goal of work at Earth Sanctuary is to combine ecological science, landscape design, and environmental art.

2 The Earth Sanctuary will take hundreds of years to recover from past land use practices.

3 This commitment is being accomplished through the development of land conservation covenants.

4 This 100-page document presents the Earth Sanctuary's ecological design process in four sections.

5 The plan includes extensive appendices detailing high tech survey techniques, wetland, wildlife, and fish studies, and plant lists.

6 It incorporates contributions on wetlands and vegetation by Scott D. Miller, on wildlife by Kathryn Kelsey, and on fish by Ann Garrett.

7 It is hoped that the «500 Years Plan» can serve as an inspiration and model for future developers and ecologists.

Ex. 6 Retell the text.

Unit 3
INTERNATIONAL FUND FOR ANIMAL WELFARE (IFAW)

Ex. 1 Read the text.

The mission of the International Fund for Animal Welfare (IFAW) is to improve the welfare of wild and domestic animals throughout the world by reducing commercial exploitation of animals, protecting wildlife habitats, and assisting animals in distress. They seek to motivate the public to prevent cruelty to animals and to promote animal welfare and conservation policies that advance the well being of both animals and people.

IFAW was founded in 1969 to confront the cruel commercial slaughter of harp and hooded seals. Having successfully rallied worldwide condemnation of the hunt, they have grown to become one of the largest international animal welfare organizations in the world. Today IFAW has offices in 12 countries and a staff of more than 200 experienced campaigners, legal and political experts, and

internationally acclaimed scientists. They are a pragmatic and dedicated family of professionals who believe that animals suffer far too much from commercial exploitation, habitat destruction, and needless cruelty. And they are joined in that belief by more than 1.8 million supporters.

Much of Africa's habitat and its wildlife are threatened by overpopulation and unsustainable use of natural resources by poor people. Raptors are no exception, over 100 species either breed in Africa or migrate there each winter from Europe and Asia. Conservation of far ranging species like raptors and other migratory birds presents special problems to biologists. How do we protect animals that range so far and need widely dispersed habitats in which to survive? The Peregrine Fund's Pan Africa Program aims to establish projects throughout Africa that train local people to do the studies needed to achieve conservation of birds, of prey and other species.

The programme will bring biologists from diverse countries and cultures together in a common effort to protect Africa's natural resources.

Useful vocabulary:
mission – миссия;
improve – улучшать(ся);
cruelty – жестокость;
harp seal – гренландский тюлень;
hooded seal – хохлач;
acclaimed – признанные;
habitat destruction – разрушение среды обитания;
threaten – угрожать;
migratory birds – мигрирующие птицы;
dispersed – рассредоточенный.

Ex. 2 Answer the following questions.

1 What is the goal of the mission of the International Fund for Animal Welfare?

2 They seek to motivate the public to prevent cruelty to animals, don't they?

3 When was IFAW founded?

4 IFAW has grown to become one of the largest international animal welfare organizations in the world, hasn't it?

5 How many offices does IFAW have?

6 Are they a pragmatic and dedicated family of professionals?

7 How many supporters do they have?

8 Much of Africa's habitat and its wildlife are threatened by overpopulation, aren't they?

9 What presents special problems to biologists?

10 What does the Peregrine Fund's Pan Africa Program aim?

Ex. 3 Translate the sentences from the text

1 They seek to motivate the public to prevent cruelty to animals and to promote animal welfare and conservation policies.

2 IFAW was founded to confront the cruel commercial slaughter of harp and hooded seals.

3 They believe that animals suffer far too much from commercial exploitation, habitat destruction, and needless cruelty.

4 Much of Africa's habitat and its wildlife are threatened by unsustainable use of natural resources by poor people.

5 Raptors are no exception, over 100 species either breed in Africa or migrate there each winter from Europe and Asia.

6 How do we protect animals that range so far and need widely dispersed habitats in which to survive?

7 The programme will bring biologists from diverse countries and cultures together in a common effort to protect Africa's natural resources.

Ex. 6 Retell the text.

Unit 4
BIRDS AND WILDLIFE

Ex. 1 Read the text

Within the boundaries of Earth Sanctuary lies a rich and unique habitat that provides refuge for a diverse community of animals. The Earth Sanctuary's three ponds, known locally as the «Newman Ponds»

occupy 25 % of the Sanctuary's land. They've been recognized for their importance as waterfowl habitat and designated as a «Habitat of Local Importance» by the Whidbey Audubon Society and the Island County Critical Areas Program.

Earth Sanctuary's «500 Years Plan» assesses the status of the Sanctuary's wildlife communities, offers recommendations for enhancing those communities, and provides data to guide the Sanctuary's restoration and landscape design. The Plan also incorporates detailed species lists of birds and other wildlife.

On any given spring morning at Earth Sanctuary you may see the local pair of nesting osprey and their new fledglings, adolescent and mature bald eagle, a great horned owl, wood ducks, killdeer, tree and violet-green swallows, cinnamon teal and great blue heron, among others. The forested areas of the Earth Sanctuary provide habitat resources for as many as 90 species of birds. Those most likely to be seen are species dependent on freshwater and forest. The aquatic environment of the ponds provides a significant feeding ground for birds.

And the pond's protected shorelines, the bog island, as well as the many tree snags (dead and dying trees) provide wonderful nesting locations for birds.

Most of these species are perching birds (known for their singing), woodpeckers, hummingbirds, owls, and hawks. Near the ponds marsh, ground and tree cavity nesting waterfowl can be found.

Useful vocabulary:
refuge – убежище, укрытие;
occupy – занимать;
waterfowl – водоплавающая птица;
designate – называть;
assess – оценивать;
wildlife – дикие животные;
nesting – гнездящийся;
osprey – орлик;
fledgling – оперившийся птенец;
bald eagle – лысый орел.

Ex. 2 Answer the following questions

1 Where does a rich and unique habitat that provides refuge for a diverse community of animals lie?

2 How many ponds are there?

3 What is Earth Sanctuary's «500 Years Plan» for?

4 What can you see at Earth Sanctuary?

5 Do the forested areas of the Earth Sanctuary provide habitat resources for as many as 90 species of birds?

6 What does the aquatic environment of the ponds provide?

7 What do the pond's protected shorelines, the bog island, as well as the many tree snags provide?

8 Most of these species are perching birds (known for their singing), woodpeckers, hummingbirds, owls, and hawks, aren't they?

9 What can be found near the pond?

10 What species of birds can be found at Earth Sanctuary?

Ex. 3 Translate the sentences from the text

1 The Earth Sanctuary's three ponds, known locally as the «Newman Ponds» occupy 25 % of the Sanctuary's land.

2 They've been recognized for their importance as waterfowl habitat.

3 Earth Sanctuary's «500 Years Plan» offers recommendations for enhancing communities.

4 The Plan also incorporates detailed species lists of birds and other wildlife.

5 The forested areas of the Earth Sanctuary provide habitat resources for as many as 90 species of birds.

6 Those most likely to be seen are species dependent on freshwater and forest.

7 And the pond's protected shorelines, the bog island, as well as the many tree snags (dead and dying trees) provide wonderful nesting locations for birds.

Ex. 6 Retell the text.

Unit 5
WETLAND ECOLOGY

Ex. 1 Read the text

The Earth Sanctuary property is characterized primarily by pond, mixed conifer forest, and alder forest. Its 72 acres are unique in the south Whidbey Island landscape for their complexity and abundance of aquatic, wetland, and forest habitats. The occurrence of three ponds bordered by mixed conifer and deciduous forest creates a combination of wildlife resources that is scarce in this region of western Washington.

In the last 150 years, nearly 90 % of the ponds and wetland systems in Washington State have been degraded and 50 % have been filled or otherwise destroyed. In the Puget Sound basin wetland losses reach nearly 70 % of the estimated wetlands present before settlement. Most remaining wetlands are not forested, found within a matrix of lands developed for agriculture or housing. The integrity of the wildlife community served by these ponds depends on the continued protection of the surrounding forest.

The majority of the Earth Sanctuary property is wetland or within a wetland buffer. The streams and waters that drain through Earth Sanctuary's natural filtering wetlands provide enormous benefits to South Whidbey Island and to Useless Bay, in particular. These benefits include mitigating flooding; maintaining water quality and quantity; recycling nutrients; providing spawning and bird breeding sites, native plant nursery areas, and travel corridors through the landscape; and providing habitat for plants, animals, and microbial life. In fact, there are more animals on Earth Sanctuary than there are humans on our entire planet Earth.

Much of Earth Sanctuary was logged some 20 years ago. To heal the degradation caused by that intrusion, an innovative, ecologically sensitive, and holistically minded restoration guided by a «500 Years Plan», is under way. Prior to developing the plans for restoration, as well as plans for environmental artworks and adjacent landscaping, extensive mapping was conducted of Earth Sanctuary's wetlands, streams, and ponds and their regulatory buffers.

Useful vocabulary:
alder forest – ольховый лес;
complexity – сложность;
deciduous – сбрасываемый;
scarce – скудный;
buffer – буфер;
nutrients – питательные вещества;
microbial – микробный;
intrusion – внедрение;
adjacent – смежный;
stream – ручей.

Ex. 2 Answer the following questions

1 What is the Earth Sanctuary property characterized?

2 What creates a combination of wildlife resources that is scarce in this region of western Washington?

3 How much of the ponds and wetland systems in Washington State have been degraded?

4 In the Puget Sound basin wetland losses reach nearly 70 % of the estimated wetlands present before settlement, doesn't it?

5 What does the integrity of the wildlife community served by these ponds depend on?

6 What is the majority of the Earth Sanctuary property?

7 What do the streams and waters that drain through Earth Sanctuary's natural filtering wetlands provide?

8 Are there more animals on Earth Sanctuary than there are humans on our entire planet Earth?

9 When was much of Earth Sanctuary logged?

10 What can help to heal the degradation caused by that intrusion?

Ex. 3 Translate the sentences from the text

1 Its 72 acres are unique in the south Whidbey Island landscape for their complexity and abundance of aquatic, wetland, and forest habitats.

2 In the Puget Sound basin wetland losses reach nearly 70 % of the estimated wetlands present before settlement.

3 The integrity of the wildlife community served by these ponds depends on the continued protection of the surrounding forest.

4 The majority of the Earth Sanctuary property is wetland or within a wetland buffer.

5 These benefits include mitigating flooding; maintaining water quality and quantity.

6 To heal the degradation caused by that intrusion, an innovative, ecologically sensitive, and holistically minded restoration is under way.

7 Prior to developing the plans for restoration extensive mapping was conducted.

Ex. 6 Retell the text.

Unit 6
FOREST RESTORATION

Ex. 1 Read the text

Historic logging practices have diminished forest plant diversity and structure at Earth Sanctuary. The goal of the Sanctuary's forest restoration is to return it to its natural profile, with a greater presence of conifers and shrub diversity. Toward that goal, the dominance of over story red alder and under story salmonberry is being reduced. This will accelerate growth rate of existing under story conifers. Felled red alder will be left on the forest floor, which will provide cover and insects for wildlife as well as returning nutrients to the soil. Likewise, standing dead trees are being preserved. These «snags» are a major component of wildlife habitat within the forest.

Two non-native plants, Himalayan blackberry and holly, are established at Earth Sanctuary. These opportunistic plants thrive in sites like Earth Sanctuary's where the land has been disturbed by logging. The removal of these very invasive and aggressive plants (Himalayan blackberry canes can grow 21 feet in one year) is an important part of the Sanctuary's work toward vegetation restoration. Cutting them repeatedly to the ground until their viability falters is a very labor-intensive activity. By removing the non-native species space is being created for the reintroduction of rose, thimbleberry and blueberry species native to this area. The reintroduction of native

plants will increase forest under story diversity and provide berries, nesting materials, and cover for birds and mammals.

While blackberry bushes are being cleared, conifers and large numbers of smaller plants are being reintroduced: over 5,000 have been planted so far. Most of them are species native to South Whidbey Island and the Puget Sound lowlands. The landscape planting around the megaliths alone has drawn from 59 native plant species.

Useful vocabulary:
logging – заготовка и транспортировка леса;
conifer – хвойное дерево;
shrub – куст;
salmonberry – малина мелкоцветная;
growth rate – темп роста;
forest floor – ярус леса;
snag – сук;
blackberry – ежевика;
vegetation – растительность;
thimbleberry – малина душистая.

Ex. 2 Answer the following questions

1 What has diminished forest plant diversity and structure at Earth Sanctuary?

2 The dominance of over story red alder and under story salmonberry is being reduced, isn't it?

3 What will accelerate growth rate of existing under story conifers?

4 Are standing dead trees being preserved?

5 What non-native plants are established at Earth Sanctuary?

6 What is an important part of the Sanctuary's work toward vegetation restoration?

7 Cutting them repeatedly to the ground until their viability falters is a very labor-intensive activity, isn't it?

8 What is being created for the reintroduction of rose, thimbleberry and blueberry species native to this area?

9 Will the reintroduction of native plants increase forest under story diversity and provide berries, nesting materials, and cover for birds and mammals?

10 How many native plant species has the landscape planting around the megaliths alone drawn from?

Ex. 3 Translate the sentences from the text

1 The goal of the Sanctuary's forest restoration is to return it to its natural profile, with a greater presence of conifers and shrub diversity.

2 Felled red alder will be left on the forest floor.

3 These «snags» are a major component of wildlife habitat within the forest.

4 These opportunistic plants thrive in sites like Earth Sanctuary's where the land has been disturbed by logging.

5 Cutting them repeatedly to the ground until their viability falters is a very labor-intensive activity.

6 The reintroduction of native plants will increase forest under story diversity and provide berries, nesting materials, and cover for birds and mammals.

7 Most of them are species native to South Whidbey Island and the Puget Sound lowlands.

Ex. 6 Retell the text.

Unit 7
SIGNALING THE FORAGER

Ex. 1 Read the text

Predators rely on a large amount of chemical information in order to be effective at foraging. Larvae had evolved so at to be quite inconspicuous and difficult for insect predators or parasitoids to detect; they are difficult to detect with visual stimuli and they do not emit chemical signals. However, the larvae need to feed and it is at this point where they inadvertently give themselves away. Exploitation of insect herbivore-induced chemicals provides the basis of information for predators and parasitoids. In this case, it is essential that the plant respond with its distress call at a time when the predator or parasitoid is available to receive the signal. Recent studies indicate that there may be some variability in the rate of emission of volatiles

over the course of the day. Peak emissions were found to occur during the photo phase, which also is the time of carnivore foraging. Additional studies have shown fluctuating emission of volatiles during different growth stages of the plant, as well as with different parts of the plant.

Corn seedlings respond to herbivore damage by a delayed release of terpenes and sesquiterpenes. Terpenoids are probably stored in glands in the leaves and are ruptured upon feeding. Release of these compounds stops as damage stops, i.e. when the caterpillar no longer chews on them. However if the caterpillar is not removed the emission slowly wanes over time as quantities lessen and caterpillars feed less. The release of these terpenoids begins only after several hours of being fed on. Terpenoid emissions seem to be strongest during daytime hours and when caterpillar regurgitates were placed on damaged tissue, terpenoid emission was detectable three days later.

Plants do respond readily to damage and with enough alacrity to signal for predators or parasitoids. In addition to releasing volatiles systemically, the volatiles are released during the day when carnivores tend to forage.

There is still some question as to whether these emissions are released at that time because that plant has adapted to predators searching hours or if the predators search during the photoperiod because that is when the majority of chemical cues are available.

Useful vocabulary:

foraging – кормодобывание;

predator – хищник;

carnivore – плотоядное животное;

corn seedling – сеянец;

terpenes – терпены (группа углеводородных органических соединений);

sesquiterpenes – сесквитерпены;

terpenoids – терпеноиды;

caterpillar – гусеница;

alacrity – готовность;

photoperiod – период фотосинтеза.

Ex. 2 Answer the following questions

1 What do predators rely on?

2 What does exploitation of insect herbivore-induced chemicals provide?

3 Is there any variability in the rate of emission of volatiles over the course of the day?

4 What does the time of carnivore foraging coincide with?

5 How do corn seedlings respond to herbivore damage?

6 Where are terpenoids stored?

7 Plants do respond readily to damage and with enough alacrity to signal for predators or parasitoids, don't they?

8 When are the volatiles released?

9 What is still not understood in the studies?

10 When are the majority of chemical cues available?

Ex. 3 Translate the sentences from the text

1 Larvae had evolved so at to be quite inconspicuous.

2 It is at this point where they inadvertently give themselves away.

3 Exploitation of insect herbivore-induced chemicals provides the basis of information for predators and parasitoids.

4 Peak emissions were found to occur during the photo phase.

5 If the caterpillar is not removed the emission slowly wanes over time as quantities lessen and caterpillars feed less.

6 Terpenoid emissions seem to be strongest during daytime hours.

7 The volatiles are released during the day when carnivores tend to forage.

Ex. 6 Retell the text.

Unit 8

THE EFFECT OF RESOURCE SPECIES DIVERSITY ON RATES OF CONSUMPTION

Ex. 1 Read and translate the text

After more than a decade of active research on the importance of species diversity for ecosystem functioning, it has been shown that

diversity affects multiple ecosystem functions. Most of this work has investigated the impact of diversity on a single trophic level. However, species diversity is also predicted to have impacts on the strength of trophic interactions, and dynamics across trophic levels. While some early experiments incorporated multiple trophic levels, only recently have experiments been designed that directly investigate the impacts of species diversity across trophic levels.

Experiments testing the impact of resource diversity on consumer effect sizes have generally shown that consumer effects are reduced. However, «consumer effects», measured in terms of consumer abundance, consumer control of resource biomass, or total consumption, can be the result of consumption over the short-term or population-level responses over multiple generations (e.g., resource abundance declines due to competition, or predator abundance increases). Previous studies have rarely separated consumption effects from population responses, and so the relative importance of each has not yet been elucidated. Among the few direct tests of the influence of resource species diversity on rates of consumption, neutral effects, positive effects, and negative effects have been demonstrated. The variability in the effect of resource diversity likely stems from the importance of the palatability of the resource species in the community and the feeding selectivity of the consumer. We expect that depending on these factors, different mechanisms determine the effect of diversity on rates of consumption.

There are a number of mechanisms by which the presence of other species could modify the rate at which a consumer consumes any particular resource. The simplest mechanism, dilution, occurs when species diversity increases but the resource species are all equally palatable and all else remains constant. In this case, the absolute consumption rate of a focal species is diminished proportionally to its decline in relative abundance, but the «prey risk», or rate of consumption per prey, remains unchanged. Complementarity occurs when resource diversity is largely palatable. In this case, diversity may provide better nutrition or improve ease of detection or capture, causing accelerated consumption. Preference occurs when a consumer displays selectivity among resource species, consuming relatively more of a preferred resource when it is available. Hindrance occurs when the consumption of an edible resource is reduced by the presence of other

species. For instance, poor quality or toxic resources may reduce foraging rates. Consumers may also waste time handling inedible resource species, or be confused by heterogeneity in infochemicals.

Useful vocabulary:
species diversity – видовое разнообразие;
trophic level – трофический уровень;
consumer effect – эффект потребителя;
resource abundance – избыток ресурсов;
elucidate – объяснять;
palatability – вкусовая привлекательность;
dilution – разжижение;
prey – добыча, предмет добычи;
nutrition – питание;
edible – съедобный.

Ex. 2 Answer the following questions

1 What has the research on the importance of species diversity for ecosystem functioning shown?

2 What does species diversity have impacts on?

3 What are «consumer effects» measured in terms of?

4 Different mechanisms determine the effect of diversity on rates of consumption, don't' they?

5 Can the presence of other species modify the rate at which a consumer consumes any particular resource?

6 When does the simplest mechanism, dilution, occur?

7 When does complementarity occur?

8 In what case may diversity provide better nutrition?

9 Preference occurs when a consumer displays selectivity among resource species, doesn't it?

10 What may reduce foraging rates?

Ex. 3 Translate the sentences from the text

1 Most of this work has investigated the impact of diversity on a single trophic level.

2 While some early experiments incorporated multiple trophic levels, only recently have experiments been designed that directly investigate the impacts of species diversity across trophic levels.

3 Previous studies have rarely separated consumption effects from population responses.

4 Among the few direct tests of the influence of resource species diversity on rates of consumption, neutral effects, positive effects, and negative effects have been demonstrated.

5 We expect that depending on these factors, different mechanisms determine the effect of diversity on rates of consumption.

6 The «prey risk», or rate of consumption per prey, remains unchanged.

7 Hindrance occurs when the consumption of an edible resource is reduced by the presence of other species.

Ex. 6 Retell the text.

Unit 9
NITROGEN TURNOVER IN THE LEAF LITTER AND FINE ROOTS OF SUGAR MAPLE

Ex. 1 Read and translate the text

The fate and consequences of atmospheric nitrogen (N) deposition are of great scientific and social interest. Because soil N availability often limits the productivity of temperate forests, N deposition could potentially increase carbon (C) storage in these ecosystems. Excess N in soil can also directly suppress litter decay, thereby providing an additional mechanism for greater ecosystem C storage. Nitrogen not internally stored or cycled in plant tissues or soil organic matter can leach to groundwater, with an oversupply of N eventually leading to N saturation and further consequences for downstream aquatic and marine ecosystems. Understanding the mechanisms that control N cycling in forests is the most powerful approach to informed predictions and policy decisions aimed at forecasting and mitigating the consequences of anthropogenic N supplied through the production and use of fertilizer and combustion of fossil fuels.

In forests, N can be cycled within trees through remobilization from one plant module to another, such as in the re-translocation of N from senescing leaves to storage in woody tissues in autumn and the

redeployment of this stored N to developing shoots in spring. Nitrogen can also be internally cycled within the soil in many different ways, e.g., from litter decay to soil solution or from soil solution into the microbial community. Finally, N can be cycled from soil to plant and back to soil, e.g., taken up by roots/mycorrhizae from the soil, internally cycled in the tree, and then eventually deposited back to the soil via litter production. Nitrogen that is not stored or cycled within the plant–soil system must ultimately be transferred to some other ecosystem (herbivory, leaching, erosion, harvest, and similar fluxes) or lost back to the atmosphere.

Trees and soil are the dominant pools of N in forests, and the incorporation of N into biomass is one potential sink for atmospheric N deposition. During the growing season, most of the N in trees is found either in the canopy (leaves and reproductive parts) or in fine roots (<1 mm in diameter) because these are the most metabolically active plant modules and they contain the highest concentrations of N-rich proteins and enzymes. Trees return most of their N to soil primarily through the death and decay of leaves, fine roots, and reproductive parts. Stem mortality and foliar leaching are normally very minor fluxes of N from plant to soil.

Useful vocabulary:
temperate forests – леса умеренной климатической зоны;
deposition – отложение;
organic matter – органическое вещество;
saturation – насыщение;
combustion – сжигание;
redeployment – перемещение;
litter decay – гниение мусора;
leaching – выщелачивание;
erosion – эрозия;
harvest – урожай.

Ex. 2 Answer the following questions

1 Can N deposition potentially increase carbon (C) storage in ecosystems?

2 What can excess N in soil directly suppress?

3 Why is it very important to understand the mechanisms that control N cycling in forests?

4 How can N be cycled in forests?

5 How can N be cycled in soil?

6 What sort of nitrogen must ultimately be transferred to some other ecosystem or lost back to the atmosphere?

7 What are the dominant pools of N in forests?

8 Where is most of the N in trees found during the growing season?

9 Why is most of the N in trees found either in the canopy or in fine roots during the growing season?

10 How do trees return most of their N to soil?

Ex. 3 Translate the sentences from the text

1 Excess N in soil can also directly suppress litter decay.

2 Nitrogen not internally stored or cycled in plant tissues or soil organic matter can leach to groundwater.

3 N can be cycled from soil to plant and back to soil.

4 The incorporation of N into biomass is one potential sink for atmospheric N deposition.

5 During the growing season, most of the N in trees is found either in the canopy or in fine roots.

6 Trees return most of their N to soil primarily through the death and decay of leaves.

7 Stem mortality and foliar leaching are normally very minor fluxes of N from plant to soil.

Ex. 6 Retell the text.

Unit 10

FOOD WEBS ARE BUILT UP WITH TESTED SUBWEBS

Ex. 1 Read the text

Within ecosystems, a number of species are connected by interspecific interactions such as trophic, mutualistic, and parasitic interactions, forming a complex network of biological communities.

Since the structure of interaction networks strongly affects community and population dynamics, identifying the structural patterns of those networks enhances our understanding of the mechanisms that shape or maintain communities. Ecological network studies comparing, for example, mutualism vs. antagonism or different habitat types promote identification of the fundamental structural relationship between communities, and the key determinants of community structure and its relevance to community dynamics.

Nestedness, defined in the context of community network research as "a pattern of interaction in which specialists interact with species that form perfect subsets of the species with which generalists interact", has been found in bipartite community networks of interspecific interactions (i.e., networks formed by two interacting functional groups, within each of which no interaction occurs). A nested interaction network has two characterizing features: (1) a generalist (i.e., a species interacting with more species) in a group interacts with generalists in the other group to form a core of densely interacting species; (2) a specialist in one group tends to interact with a few generalists in the other group.

Bascompte et al. (2003) reported that animal – plant mutualistic networks, such as plant – seed disperser and plant – pollinator communities, are highly nested. Subsequently, the same structure has been repeatedly found in other types of mutualistic networks, such as between ants and extrafloral nectary-bearing plants, anemone fish and sea anemone, and marine cleaning mutualism. These findings led to a hypothesis that nested structure is a general pattern of mutualistic networks and initiated studies that aimed to identify the cause and ecological consequence of nested structure in mutualistic communities.

Given the important implications of nested structure in community ecology, its evaluation in other types of networks would be of particular importance, especially when nested structure is predicted to be disfavored by antagonistic interactions. However, most reported nested networks are of mutualistic interactions, except for a few studies. Thus, it is unclear whether nested structure is an exclusive feature of mutualistic networks.

Useful vocabulary:
mutualism – симбиоз;
antagonism – противоречие;
key determinant – определяющий фактор;
subset – подмножество;
bipartite – двусторонний;
nested – гнездовой;
seed disperser – рассеиватель семян;
pollinator – опылитель;
nectary-bearing – нектаросодержащие;
anemone – ветреница.

Ex. 2 Answer the following questions

1 What connects species within ecosystems?
2 What affects community and population dynamics?
3 What is nestedness?
4 Where has nestedness been found?
5 What characteristics does a nested interaction network have?
6 Animal – plant mutualistic networks aren't nested?
7 What does the hypothesis mentioned in the text say?
8 Is nested structure predicted to be disfavored by antagonistic interactions?
9 Are most reported nested networks of mutualistic interactions?
10 Is it unclear whether nested structure is an exclusive feature of mutualistic networks?

Ex. 3 Translate the sentences from the text

1 A number of species are connected by interspecific interactions such as trophic, mutualistic, and parasitic interactions.
2 Since the structure of interaction networks strongly affects community and population dynamics, identifying the structural patterns of those networks enhances our understanding of the mechanisms that shape or maintain communities.
3 Ecological network studies promote identification of the fundamental structural relationship between communities.
4 A nested interaction network has two characterizing features.
5 Subsequently, the same structure has been repeatedly found in other types of mutualistic networks.

6 Given the important implications of nested structure in community ecology, its evaluation in other types of networks would be of particular importance.

7 Nested structure is predicted to be disfavored by antagonistic interactions.

Ex. 6 Retell the text.

Unit 11

TEMPORAL STABILITY OF CORAL REEF FISH POPULATIONS

Ex. 1 Read the text

The ongoing decline and degradation of coral reef ecosystems worldwide underpins the need to quantify the relative impacts of human-induced stressors on these centers of species diversity and endemism, and identify the major drivers of their resistance and resilience. Cost-effective allocation of management resources requires tractable methods for prioritizing areas for conservation. Central to this goal is an ability to rank reefs from those that are most susceptible to disturbance to those that might act as sources for recolonization.

The temporal stability of fish abundances is likely to be an important metric of resilience of coral reef communities to disturbance. In non-reef ecosystems, both theoretical and empirical evidence suggests that sources of demographic and/or environmental stochasticity that cause large fluctuation in population abundance increase the risk of successive bottlenecks and of total (or effective) abundance falling below a population's minimum viable size, ultimately leading to its extinction. This risk is expected to increase in coming decades, with major drivers of extinctions displaying synergistic effects under global change.

The temporal stability of assemblages also tends to be positively related to species richness, with lower richness implying fewer but stronger interactions within assemblages. Moreover, species richness generally increases with patch size of habitats and decreases with population isolation. Although such relationships are well-established

in terrestrial ecosystems, area and isolation effects on community structure and dynamics have only been recently demonstrated for some coral reefs. The idea that the temporal stability of fish assemblages on coral reefs varies as a function of reef area and isolation has not yet, however, been tested empirically.

Useful vocabulary:
species diversity – видовое разнообразие;
tractable – прицепной;
cost-effective – рентабельный;
allocation – распределение;
abundance – избыток, изобилие;
resilience – гибкость;
bottleneck – сильное ограничение;
viable – жизнеспособный;
fluctuation – колебание;
assemblage – соединение, объединение.

Ex. 2 Answer the following questions

1 What underpins the need to quantify the relative impacts of human-induced stressors on these centers of species diversity and endemism?

2 What methods does cost-effective allocation of management resources require?

3 What is an important metric of resilience of coral reef communities to disturbance?

4 What increases the risk of successive bottlenecks and of total (or effective) abundance falling below a population's minimum viable size in non-reef ecosystems?

5 What does the temporal stability of assemblages also tend to be positively related to?

6 Species richness generally increases with patch size of habitats, doesn’t it?

7 What makes species richness decrease?

8 Have area and isolation effects on community structure and dynamics been demonstrated for some coral reefs?

9 Does the temporal stability of fish assemblages on coral reefs vary as a function of reef area and isolation?

10 Has the idea that the temporal stability of fish assemblages on coral reefs varies as a function of reef area and isolation been tested empirically?

Ex. 3 Translate the sentences from the text

1 The ongoing decline and degradation of coral reef ecosystems worldwide underpins the need to quantify the relative impacts of human-induced stressors on these centers of species diversity.

2 Central to this goal is an ability to rank reefs from those that are most susceptible to disturbance to those that might act as sources for recolonization.

3 Both theoretical and empirical evidence suggests that sources of demographic and/or environmental stochasticity increase the risk of successive bottlenecks.

4 This risk is expected to increase in coming decades, with major drivers of extinctions displaying synergistic effects under global change.

5 The temporal stability of assemblages also tends to be positively related to species richness.

6 Moreover, species richness generally increases with patch size of habitats.

7 Although such relationships are well-established in terrestrial ecosystems, area and isolation effects on community structure.

Ex. 6 Retell the text.

Unit 12
PHENOLOGY

Ex. 1 Read the text

Phenological responses to climate change are expected to differ among species, thereby altering interactions within ecological communities. Most phenological research has focused on the immediate effects of altering the timing of a single life-history event on specific ecological interactions. However, many interactions extend throughout an individual's life cycle, and the nature and

strength of such interactions can vary during ontogeny. Because climate change may alter the development rates of individuals, the relative effect of stage-dependent interactions on long-term ecological processes may also change. Consequently, understanding the net effect of climate change on ecological communities will require explicit consideration of stage-specific responses of species to climate effects.

Field studies in this system have revealed strong top-down control in which a spider acts as an indirect keystone predator whose effects are mediated by the adaptive foraging of a grasshopper herbivore. P. mira predation is compensatory to natural grasshopper mortality, and instead affect the system by altering grasshopper diet composition. When exposed to predation risk by P. mira, grasshoppers seek refuge in the competitively dominant herb Solidago rugosa, which is reduced in abundance due to increased grasshopper herbivory.

Grasshoppers respond to predation risk differently during their development. While predator effects may be significant early in ontogeny, these effects attenuate as the end of the growing season approaches and individuals risk not maturing in time to reproduce. Warming can accelerate grasshopper development, reducing the duration of nymphal stages and allowing grasshoppers to reach maturity more quickly. However, quickly developing nymphs may have higher nutritional demands, requiring them to adapt their feeding behaviors in ways that may increase their exposure to predators. Spiders are more sensitive to warming temperatures than grasshoppers, and respond to warming by seeking thermal refuge lower in the plant canopy where temperatures are cooler. Grasshoppers capitalize on this difference in thermal tolerances by concentrating their foraging efforts to the hottest parts of the day when spiders are less active.

These physiological differences between spider and grasshoppers suggest that warming may decrease top-down control and weaken the strength of the indirect effect of predators on plants.

Useful vocabulary:
phenology – фенология;
timing – определение времени;
life cycle – жизненный цикл;

ontogeny – онтогенез;
net effect – сетевой эффект;
field studies – полевые исследования;
grasshopper – кузнечик;
herb – трава;
maturity – зрелость;
spider – паук.

Ex. 2 Answer the following questions

1 What has most phenological research focused on?

2 Many interactions extend throughout an individual's life cycle, don't they?

3 Can the nature and strength of such interactions vary during ontogeny?

4 What may alter the development rates of individuals?

5 What will understanding the net effect of climate change on ecological communities require?

6 P. mira predation is compensatory to natural grasshopper mortality, isn't it?

7 How do grasshoppers respond to predation risk?

8 What can accelerate grasshopper development?

9 Spiders are less sensitive to warming temperatures than grasshoppers, aren't they?

10 What may decrease top-down control and weaken the strength of the indirect effect of predators on plants?

Ex. 3 Translate the sentences from the text

1 Phenological responses to climate change are expected to differ among species.

2 The nature and strength of such interactions can vary during ontogeny.

3 The relative effect of stage-dependent interactions on long-term ecological processes may also change.

4 Effects are mediated by the adaptive foraging of a grasshopper herbivore.

5 When exposed to predation risk by P. mira, grasshoppers seek refuge in the competitively dominant herb Solidago rugosa.

6 While predator effects may be significant early in ontogeny, these effects attenuate as the end of the growing season approaches.

7 Grasshoppers capitalize on this difference in thermal tolerances by concentrating their foraging efforts to the hottest parts of the day.

Ex. 6 Retell the text.

Unit 13
PREDATOR-PREY REVERSAL

Ex. 1 Read the text

Unexpected and catastrophic shifts in ecosystems have been linked to a phenomenon known as “ecosystem hysteresis”. Ecosystem hysteresis occurs when changes in the state of an ecosystem are path dependent. If, for example, the forward and backward shifts between two ecosystem states occur at different critical conditions, then two alternative ecosystem states will be possible under the same external conditions. Ecosystem hysteresis is generated by various mechanisms of reinforcement that keep the system in a given state. Classical examples are the feedback between soil insulation and vegetation cover in Arctic tundra ecosystems, or between vegetation cover and soil moisture in dry regions. In marine ecosystems, overfishing of top predators has frequently been followed by fundamental changes in ecosystem properties, suggesting that internal feedback mechanisms might be present. In northern-shelf ecosystems these changes include a persistent low abundance of predatory fish and a high abundance of small, pelagic, forage fish species. Small, pelagic, forage fish are often themselves predators on the egg and juvenile stages of their larger fish predators. Such reversals of predator–prey roles generate internal feedbacks that can promote alternative stable states and therefore cause ecosystem hysteresis to occur under changing conditions. According to this hypothesis, a large population of predator fish will secure its own recruitment by controlling the population of pelagic fish, thereby arresting the system in a predator-dominated state. Conversely, a large population of pelagic fish will reduce the recruitment of predators, arresting the system in a prey-dominated

state. Selective human harvesting of either the top predators or the pelagic fish resources may cause ecosystem shifts by “pushing” the system between the two different states. When selective harvesting has caused an ecosystem shift, it might be necessary to switch the target species of the fishery, and not only reduce the catches in order for the declined species to rebound. Accordingly, predator–prey reversal can create path dependency and ecosystem hysteresis. Historically, human harvesting has targeted the larger species and, in many cases, has extirpated the upper trophic levels. At present, dominating stocks of small pelagic fishes in systems such as the Baltic Sea and the Scotian Shelf may prevent the recovery of large predator fishes through mechanisms such as predator–prey reversal, even if fishing pressure is reduced.

Useful vocabulary:
ecosystem hysteresis – экосистемное запаздывание;
reinforcement – укрепление;
soil insulation – почвенная изоляция;
vegetation cover – растительный покров;
soil moisture – почвенная влага;
overfishing – чрезмерный промысел;
pelagic – океанический;
fishery – рыбная ловля;
extirpate – уничтожать;
trophic – трофический.

Ex. 2 Answer the following questions

1 When does ecosystem hysteresis occur?

2 On what condition will two alternative ecosystem states be possible?

3 Ecosystem hysteresis is generated by various mechanisms of reinforcement, isn’t it?

4 In marine ecosystems, overfishing of top predators has rarely been followed by fundamental changes in ecosystem properties, hasn’t it?

5 Are small, pelagic, forage fish often themselves predators on the egg and juvenile stages of their larger fish predators?

6 What do such reversals of predator–prey roles generate?

7 In what way will a large population of predator fish secure its own recruitment?

8 Will a large population of pelagic fish increase the recruitment of predators?

9 When might it be necessary to switch the target species of the fishery?

10 Has human harvesting targeted the larger species and extirpated the upper trophic levels?

Ex. 3 Translate the sentences from the text.

1 Unexpected and catastrophic shifts in ecosystems have been linked to a phenomenon known as “ecosystem hysteresis”.

2 The forward and backward shifts between two ecosystem states occur at different critical conditions.

3 Classical examples are the feedback between soil insulation and vegetation cover in Arctic tundra ecosystems.

4 In northern-shelf ecosystems these changes include a persistent low abundance of predatory fish.

5 Small, pelagic, forage fish are often themselves predators on the egg and juvenile stages of their larger fish predators.

6 Such reversals of predator–prey roles generate internal feedbacks.

7 Selective human harvesting of either the top predators or the pelagic fish resources may cause ecosystem shifts by “pushing” the system between the two different states.

Ex. 6 Retell the text.

Unit 14
OCEAN WARMING

Ex. 1 Read the text.

Global climate change is hypothesized to lead to the increased invasion of communities by nonnative species, thus compounding threats to biodiversity. Correlative evidence from terrestrial systems suggests that invasive species have larger latitudinal ranges than native species, which may be indicative of their ability to tolerate a broader range of environmental conditions and their potential for greater success

at increased temperatures. However, few empirical studies have specifically linked climate change to increasing abundances of nonnative species, especially in marine systems. This is in part because it is challenging to separate climate change effects from invasion processes, such as propagule supply, which cannot be controlled in most field studies. We examined the effects of temperature on survival and growth of native and nonnative species in a subtidal community using laboratory mesocosms in which propagule supply was absent. Previous studies indicate that temperature increases similar to those predicted by climate change models and can strongly impact marine species, but less is known about responses of marine invaders relative to native species.

Space is an important limiting resource in fouling communities, and we therefore focused our experiments on the temperature dependence of the processes most important for allowing juveniles to initally acquire and maintain space. In the early life stages considered here, these processes include survival and growth. Competition becomes important in later stages and is strongly size dependent; thus, there is a direct relationship between initial acquisition of bare space and adult abundance. We first conducted temperature tolerance experiments to address the hypothesis that introduced species are more tolerant of high temperatures than native species. Second, we determined the survival and growth rates of the common space-holders in the fouling community in Bodega Harbor at current (ambient) and future predicted temperatures. Our results indicate that, as ocean temperatures increase, the fouling community is likely to become increasingly dominated by introduced species.

Useful vocabulary:
nonnative – неродной;
terrestrial – земной;
propagule – побег, росток;
subtidal – расположенный ниже приливно-отливной зоны;
fouling – загрязненный;
survival – выживание;
bare space – пустое пространство;
tolerant – выносливый. устойчивый;
ambient – внешний;
community – сообщество.

Ex. 2 Answer the following questions

1 What does global climate change lead to?

2 What does correlative evidence from terrestrial systems suggests?

3 Few empirical studies have specifically linked climate change to increasing abundances of nonnative species, haven't they?

4 Is it challenging to separate climate change effects from invasion processes?

5 What do previous studies indicate?

6 What is known about responses of marine invaders relative to native species?

7 What is an important limiting resource in fouling communities?

8 What becomes important in later stages and is strongly size dependent?

9 There is a direct relationship between initial acquisition of bare space and adult abundance, isn't there?

10 As ocean temperatures increase, the fouling community is likely to become increasingly dominated by introduced species, isn't it?

Ex. 3 Translate the sentences from the text

1 Invasive species have larger latitudinal ranges than native species, which may be indicative of their ability to tolerate a broader range of environmental conditions.

2 This is in part because it is challenging to separate climate change effects from invasion processes.

3 We examined the effects of temperature on survival and growth of native and nonnative species in a subtidal community using laboratory mesocosms.

4 Less is known about responses of marine invaders relative to native species.

5 We therefore focused our experiments on the temperature dependence of the processes most important for allowing juveniles to initally acquire and maintain space.

6 We first conducted temperature tolerance experiments to address the hypothesis.

7 Second, we determined the survival and growth rates of the common space-holders in the fouling community.

Ex. 6 Retell the text.

Unit 15
PLANT GEOGRAPHY UPON THE BASIS OF FUNCTIONAL TRAITS

Ex. 1 Read the text

The geographic distributions of species result from the interplay of historical contingency and species interactions with the abiotic and biotic environment. Plant geographers and plant ecologists have advocated a functional approach to studying the distribution and coexistence of plant species for over a century. This approach argues that by examining the function of a plant and the way that function relates to the environment, a mechanistic and predictive framework for studying the distribution and coexistence of species can be achieved. Thus, a major theme in plant ecology has been to quantify and define plant functional strategies. The concept of plant functional strategies is useful in that it compares the functional strategy of a species in relation to a global range of alternative strategies. Thus quantifying the plant traits that represent the functional strategies of each species in a community provides a refined insight into the geographic distribution of species.

Over the past decade attempts to identify the key axes or dimensions of plant function that confer their functional strategies have intensified and resulted in a list of a limited number of plant traits, many of which are easily measurable, that can be used to quantitatively represent the functional strategies of plant species. This widely recognized suite of plant functional traits has led to a number of initial broad-scale investigations into topics ranging from the evolution of plant functional traits to species coexistence in diverse tropical communities.

Despite this progress, there remain several outstanding challenges that require the integration of large trait and plant occurrence data sets. One clear challenge has been to produce maps that depict the geographic distribution of continuous plant functional trait values. Such maps could be used to test ecological hypotheses, further our understanding of ecosystem function, and refine the next generation of global vegetation models. A related challenge is to understand whether plant functional trait distributions within and across

vegetation types or life zones can be predicted using the distribution of functional trait values found in a community. For example, are community functional trait distributions indicative of the Holdridge life zones in which they reside? If so, this would allow researchers to predict the functional composition of life zones across continents and how that composition may be altered by climatic shifts.

Useful vocabulary:
distribution – распределение;
abiotic – неживой;
coexistence – сосуществование;
trait – особенность;
vegetation models – модели растительности;
map – карта;
vegetation type – тип растительности;
tolerant – выносливый. устойчивый;
indicative – свидетельствующий;
alter – менять.

Ex. 2 Answer the following questions

1 Do the geographic distributions of species result from the interplay of historical contingency and species interactions with the abiotic and biotic environment?

2 What have plant geographers and plant ecologists advocated?

3 How can a mechanistic and predictive framework for studying the distribution and coexistence of species be achieved?

4 What is a major theme in plant ecology?

5 In what is the concept of plant functional strategies useful?

6 Over the past decade attempts to identify the key axes or dimensions of plant function that confer their functional strategies have intensified, haven't they?

7 What has this widely recognized suite of plant functional traits led to?

8 There are several outstanding challenges that require the integration of large trait and plant occurrence data sets, aren't there?

9 Can plant functional trait distributions within and across vegetation types or life zones be predicted using the distribution of functional trait values found in a community?

10 This would allow researchers to predict the functional composition of life zones across continents, wouldn't it?

Ex. 3 Translate the sentences from the text

1 This approach argues that by examining the function of a plant and the way that function relates to the environment, a mechanistic and predictive framework for studying the distribution and coexistence of species can be achieved.

2 It compares the functional strategy of a species in relation to a global range of alternative strategies.

3 Thus quantifying the plant traits provides a refined insight into the geographic distribution of species.

4 Over the past decade attempts to identify the key axes or dimensions of plant function have intensified.

5 This widely recognized suite of plant functional traits has led to a number of initial broad-scale investigations into topics.

6 Despite this progress, there remain several outstanding challenges that require the integration of large trait and plant occurrence data sets.

7 A related challenge is to understand whether plant functional trait distributions within and across vegetation types or life zones can be predicted using the distribution of functional trait values found in a community.

Ex. 6 Retell the text.

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