

gare centrale et en voisinage de l'institut botanique. Le Jardin des plantes est construit en style anglais avec le système complet et quelques groupes spéciales, notamment le groupe alpin, les étangs aux hygrophites e. c. Les étangs aux cultures de *Nelumbo* et d'autres *Nymphéacées* sont très importants. Encore il y a 8 serres, dans lesquelles se trouvent des plantes tropicales et sous-tropicales, notamment les cultures de plantes succulentes et des Orchidées et des Aroïdées. On cultive séparément les spécialités de la flore balcanique.

Contents of papers issued by the Botanical Institute of the University of Zagreb. from 1913 – 1923.

1. VOUK V.: Gutacija i hidatode kod *Oxalis* vrsta. »Rad. Jugoslavenske Akademije, Knj. 204. str. 151. 1914.

Guttation and Hydathodes of the *Oxalis* Species.

Of the twelve examined Species Guttation is shown only in: *Oxalis Tweedeana*, *O. Martiana*, *O. Deppei*, *O. brasiliensis*, and *O. cernua*. These have typical Epithem-Hydathodes which possess specific peculiarities. No guttation could be observed in *O. carnosa*, *O. stricta*, and *O. acetosella*. Species with typical Hydathodes exist particularly in tropical damp regions, while the middle-European Species, growing in dry soil, have no typical Hydathodes.

2. PEVALEK I.: Vegetaciona snimka sjevero-dalmatinskog otoka Silbe u mjesecu svibnju. Nastavni Vijesnik, knj. 23. 1914.

A Sketch of the Vegetation of the North-Dalmatian isle of Silba in the month of May.

A list of names of 113 vascular plants together with the description of the commonest plant societies.

3. VOUK V.: Eine Bemerkung zur Oekologie von *Phyllitis hybrida*. Oestereichische botanische Zeitschrift 1915. p. 41—43.

A Remark concerning the Ecology of the *Phyllitis hybrida*.

The author describes a new habitat of *Phyllitis hybrida* on the îsle of Pag in the Gulf of Quarnero. Contrary to Morton's he considers *Phyllitis hybrida* to be a Mesophyt with distinct xerophytic adaptability

4. VOUK V.: O istraživanju fitobetosa u Kvarnerskom zalju. Prirodoslovna istraživanja Hrvatske i Slavonije izdala Jugoslavenska Akademija znanosti i umjetnosti. Sv. 2. 1914; Sv. 5. 1914.

Researches on the Phytobenthos of the Gulf of Quarnero.

A contribution to the Revision of the treatise by Lorenz: »Physikalische Verhältnisse und Verteilung der Organismen im Quarnerischen Golfe« published in 1863. Contains many new habitats of Sea-Algae with several biological observatinos.

5. VOUK V.: Das Problem der pflanzlichen Symbiosen. Biologen-Kalender 1914.

The Problem of the Symbiosis of Plants.

By way of an introduction three reasons are given for the Definition of the Symbiosis which reads as follows: »The Symbiosis is a cellular and synharmonic cohabitation of heterogenic Organisms.« The principle of Synharmonie is only an extension of the idea of Epharmonie originated by Wiesner. It further contains several descriptions of the Symbiosis of Bacteria, Fungi and Algae. The paper winds up with a physiological signification of Symbiosis. The author's opinion is that the physiological signification of plant Symbiosis consists in the interaction of Bionts in the Carbon- and Nitrogen-Assimilation.

6. VOUK V.: Morska vegetacija Bakarskog zaliva. Prirodoslovna istraživanja Hrvatske i Slavonije; izdala Jugosl. Akademija znanosti i umjetnosti u Zagrebu. Sv. 6. 1915.

Sea Vegetation of the Bay of Bakar.

A description of Sea Vegetation of the little Bay of Bakar on the Croatian coast of Adria. This vegetation is much influenced by numerous freshwater springs beneath the Sea. Rodophyceae are less numerous than Chlorophyceae. As most important Formations are described: Ulvetum, Dasycladetum, Zosteretum and Cystosiretum. The author distinguishes only littoral and sublittoral regions in a vertical division. A rame list of Algae fond there closes the paper.

7. VOUK V.: Dvije nove morske alge iz Hrvatskog Primorja. Prirodoslovna istraživanja Hrvatske i Slavonije Jugoslav. Akademija znanosti u Zagrebu. Sv. 6. 1915.

Two new Sea-Algae of the Croatian Coast. As new Species and Varieties are described: *Chaetomorpha aerea* var. *tuniformis* and *Arthrospira tuniformis*.

8. PEVALEK I.: *Sisyrrinchium angustifolium* Mill. u Hrvatskoj. Prirodoslovna istraživanja Hrvatske i Slavonije. Jugoslav. Akademija znanosti. Sv. VII. 1915.

Sisyrrinchium angustifolium Mill. in Croatia.

The author reports his finding the *Sisyrrinchium angustifolium* in Croatia on the banks of the river Sava in the neighbourhood of the town of Zagreb. This is the southernmost habitat of this plant in Europe.

9. CIHLAR CVIJETA: Mikrokemijska istraživanja o hitinu bilinskih membrana. Glasnik hrv. prirodoslovnog društva XXVII. p. 3—18. 1915.

Microchemical researches upon the chitin of plant membranes.

Agreeing with Wester and contrary to the opinions of Hegler and Kohl the author proves that Cyanophyceae contain no chitin in their membranes.

10. PEVALEK I. i VOUK V.: Prilog poznavanju gljiva zagrebačke okoline. Prirodoslovna istraživanja Hrv. i Slav. izdaje Jugoslavenska Akademija.

A contribution to the mushroom Flora in the neighbourhood of Zagreb.

A list of 153 different Species of mushrooms is given. *Chaly-motta macrocystis* is described as a new one.

11. VOUK V.: Die Umstimmung des Phototropismus bei Chara sp. Berichte der deutschen Botanischen Gesellschaft Bd. XXXIII. Heft 8. p. 410. 1915.

Change of Disposition of Phototropism in Chara sp.

By day-light the new seed-bud shows negative Phototropism, which with the growth of then stem changes into a positive one.

12. VOUK V. Zur Kenntniss der mikrochemischen Chitinreaktion. Berichte der deutschen botanischen Gesellschaft, Band XXXIII. Heft 8. 413 p. 1915.

A contribution to Our Knowledge of the Microchemical Reaction of Chitin.

Author recommends to boil the objects from 5—10 minutes long in an open glass at the temperature of 100 C°. instead of at 160 C. in an oil bath.

13. PEVALEK I.: O biologiji i geografskom rasprostranjenju alga u sjevernoj Hrvatskoj. Prirodoslovna istraživanja Hrvatske i Slavonije izdaje Jugoslavenska Akademija VIII. p. 25—55, 1916.

On the Biology and Geographical Distribution, of Freshwater-Algae in North Croatia.

A list of 226 Algae, 221 being entirely new in this region, is followed by an ecological classification of Algae in connection with Schröder and Comère. The paper closes with new proofs and explanation of the Periodicity of the appearance of *Spirogyra*.

14. VOUK V.: Biološka istraživanja termalnih voda hrvatskog Zagorja. Prirodoslovna istraživanja Hrvatske i Slavonije izdaje Jugoslavenska Akademija, Sv. 8. p. 1.—17. 1916.

Biological Researches on the Thermal Springs of Zagorje in Croatia.

Having investigated the Vegetation of Algae in a number of Thermal Springs in North Croatia the author classifies these springs as follows:

1. Cold springs or Hypothermae (under 18° C).
2. Lukewarm springs or Hliarothermae (18—30° C).
3. Warm springs or Euthermæ (30—40° C).
4. Hot springs or Acrothermae (40—60° C).
5. Boiling springs or Hyperthermae (over 60° C).

Most of the examined thermae are characterized by the formation of *Cyanophyceae*. Two of them are also characterized by sulphureous Bacteria. As new Species are described: *Phormidium thermale*, *Hyphaeotrix jassaensis*, *Noctoc termophilum*, *Microcoleus thermalis*.

15. PETAJ VJERA: Ekstraflorealni nektariji na lišću pajasena (*Ailanthus glandulosa*). Rad Jugoslavenske Akademije, knj. 215. p. 58—81, 1916.

Extrafloral Nectar-glands on the Leaves of *Ailanthus glandulosa*.

The anatomical structure of extrafloral Nectar-glands of *Ailanthus glandulosa* is exactly demonstrated. By means of micro-chemical tests the formation of nectar is determined and the way of its secretion detailed.

16. PEVALEK I. i VOUK V.: Prilog poznavanju bazidiomiceta sjeverne Hrvatske. Prirodoslovna istraživanja Hrvatske i Slavonije izdaje Jugoslavenska Akademija, Sv. 8. p. 18—24, 1918.

A Contribution to the Basidiomycetes of Northern Croatia.

Contains a list of 205 Basidiomycetes as new in this region.

17. VOUK V.: Nochmals zur Oecologie von *Phyllitis hybrida*. Oesterreich Botanische Zeitschrift Band 66 Nr. 10—12, 1916.

Another contribution to the Ecology of *Phyllitis hybrida*.

Contains the answer to some Morton's remarks concerning a previous contribution of the author on the same subject. Author defends his opinion regarding the xerophytic Nature of *Phyllitis hybrida*.

18. VOUK V.: Dodatak istraživanjima o gutaciji hidatodama kod Oxalis-vrsta. Rad Jugoslavenske Akademije, Knj. 215, 1917, p. 55—58.

A supplement Note to the Researches on the Guttation and Hydathodes of the Oxalis-Species.

Different species are described. The authors main result is that the anatomical structure of Hydathodes depends on their ecological condition.

19. VOUK V.: Medljika na ogrozdu (*Sphaerotheca mors uvae Berk et Curt*) u Hrvatskoj. Gospodarska smotra (Agriculture Revue). God. VIII. p. 133—135, 1917.

Mildew on gooseberries in Croatia.

Mildew on gooseberries noticed for the first time.

20. VOUK V.: Fiziološki prilog poznavanju razvoja *Nepenthes*-lista. Rad Jugoslavenske Akademije znanosti. Knj. 19. p. 15—25. 1918.

A physiological contribution concerning the Development of the Leaf of *Nepenthes*.

By means of physiological proofs the author is trying to support Goebel's opinion concerning the morphological value of pitcher stalks. This pitcher-stalks are closely following the laws of the growth of the plant itself. This fact should be regarded as a new proof of the author's opinion as to the morphological value of the pitcher-stalks.

21. VOUK V.: Biološka istraživanja termalnih voda Hrvatske i Slavonije. Prirodoslovna istraživanja Hrvatske i Slavonije izdaje Jugoslav. Akademija, Sv. 14, 1919.

Biological Researches on the Thermal Springs of Croatia and Slavonia.

A continuation of investigations made by author in North Croatia and published before. Contains mainly a description of biological conditions of thermae of that region. The author emphasizes the occurrence of clean formations of *Cyanophyceae*. As new species are described: *Oscillatoria jasorvensis* and *Lyngbya Molitschi*. The latter is especially characterized by iron incrustations. Finally, the following new varieties of algae are described: *Oscillatoria tenuis* var. *tenuior* and *Symploca thermalis* var. *major*.

22. PEVALEK I.: Prilog poznavanju alga Hrvatske i Slavonije. Prirodoslovna istraživanja Hrvatske i Slavonije, izdaje Jugosl. Akademija, Sv. 14. p. 153—162. 1919.

A contribution to our Knowledge of Algae of Croatia and Slavonia.

Particularly worth of note are the interesting lime incrustations on the Lakes of Plitvice which are built chiefly of *Cyanophyceae*. These lime incrustations have supplied the important material for the formation of calcareous tuff.

23. VOUK V.: Prilozi flori slatkovodnih alga Hrvatske. Prirodoslovna istraživanja Hrvatske i Slavonije. Sv. 14, 1919.

Contributions to the Freshwater Algae of Croatia.

It is worthnoticing that *Lemanea fucina* and *Thorea ramosissima* are to be found in Croatia.

24. VOUK V.: Željezne cianoficeje. Rad Jugoslavenske Akademije, knj. 223, 1920.

On the Ferruginous Cyanophyceae.

The author has investigated about fifty different species of *Cyanophyceae* partly from the exsiccate-works partly from the preserved material collected in some Croatian thermal springs. Only three species gave a positive reaction with potassium ferrocyanid + HCl (*Phormidium payraceum* f. *lutescens*, *Ph. antliaria* and *Ph. tinctorium*). In all these cases mucous strata were ferruginous but not so the pectinous sheaths. These are optional iron-organisms, which deposit iron only on the surface. Only *Lyngbya Molischi* from the thermals springs of Daruvar shows also when alive remarkable deposits of iron in its sheaths. *L. Molischi* and probably *L. ferruginea*, *L. ochracea* and *Hydrocoleus ferruginous* belong to the first group of *obligatory* iron-organisms.

25. BOŠNJK K.: Floristički izlet na Vranjica-planinu u Bosni. Glasnik hrv. prirod. društva XXXII. 1920.

Floristic excursion to the Vranjica-planina in Bosnia.

An excursion to the Vranjica-Planina in Bosnia with a description of its Flora.

26. GJURAŠIN STJ.: Prilog hrvatskoj flori. Glasnik hrv. prirodoslovnog društva. God. XXXII. 1920.

A Contribution to the Flora of Croatia.

Contains some new floristic reports dealing especially with the region of the Velebit-mountain.

27. HORVAT I.: Die Bedeutung des Gametophyten für die Phylogenie der Filicineen. Glasnik hrv. prirodoslovnog društva. God. XXXIII. 1921.

On the significance of Gametophyte in for the Phylogeny of Filicinee.

A careful and critical study of the Literature of the problem mentioned in the title.

28. JURIŠIĆ PETAR: Plasmaströmung und osmotischer Druck in Pflanzenzellen. Zeitschrift für allgemeine Physiologie Bd. XX. Heft 1/2.

Protoplasma-Streaming and Osmotic-Pressure in Plant-Cells.

The independence of Protoplasmic streaming and of osmotic pressure in the cell is demonstrated.

29. PEVALEK I.: O šafranu *Crocus vittatus* Schl. et Vuk. Glasnik hrv. prirodoslovnog društva. God. XXXIV. 1922.

On the *Crocus vittatus* Schl. et Vuk.

The right of existence of *Crocus vittatus* is denied and Synomimic with *Crocus vernus* proved.

30. HORVAT I.: Gametofpaprati *Phyllitis hybrida* i *Ceterach officinarum*. Rad Jugoslavenske Akademije, Knj. 226, 1922.

The gametophyt of the Fern *Phyllitis hybrida* and *Ceterach officinarum*.

A comparative study and description of the Gametophyt of the *Phyllitis hybrida* and *Ceterach officinarum*. They show important differences of the Gametophyt, especially by the missing of hairs the latter. The author describes interesting features of the Gametophyt which can stand dryness for days. Author ascribes these features to the xerophytic adaptation.

31. GICKLHORN J.: Notitz über den durch *Chromulina smaragdina* nov. sp. bedingten Smaragdglanz des Wasserspiegels. Archiv für Protistenkunde, Bd. 44, Heft 2, 1922.

Note on the Emerald Radiance reflected on water surface as caused by *Chromulina smaragdina* nov. spec.

32. VARIČAK B.: Studije o čađavici. Glasnik hrv. prirodoslovnog društva, XXXIV. Sv. 1., 1922.

Studies of sooty moulds.

The author has examined the sooty crust of moulds, which appear on laeves and branches of trees of various plants forming the so called »Russtau«, to be found largely and particularly in some parts of Zagorje in Croatia. His investigations confirm Neger's results. He is the first to solve this problem. Biological analysis of these sooty moulds shows a mixture of various Imperfecta among which an Species *Alternaria* is the chief form. As accompanying components appear: *Cladosporium herbarum*, *Coniothecium* sp. *Dematium pullulans*, *Hormodendron cladosporioides* and *Triposporium* sp. Sooty moulds develop wherever the shield-lice discharge a honeyed substance. In hothouses »Russtau« is composed of *Fumago vagans* only.

33. GICKLHORN J.: Studien an *Zoophagus insidians* (Sommerst.) einem Tiere fangendem Pilz. Glasnik hrv. prirodoslovnog društva, XXXIV. 1922.

Studies on *Zoophagus insidians*, a mushroom trapping animals.

The author discovered this rare insectivorous Fungus in the basin of the Botanical Garden in Zagreb. He describes the following new biological and morphological features of this fungus: habitat, growth, microchemistry, and distribution of its cellbodies; the germ of short-hyphae; the trapping of Rotatores, their generation and systematical position, deformity and deegration and finally a few observations on culture.

34. VOUK V.: Temperaturne granice termalne alge *Mastigocladus laminosus*. Spomenica 50-godišnjice profesorskoga rada S. M. Lozanića. Beograd 1922.

The limits of Temperature in the life of the Thermal Alga *Mastigocladus laminosus*.

Optimal temperature in which *Mastigocladus laminosus* grows is from 53 to 54 C.^o while its Maximum and Minimum approaches cannot be decided. In temperature below 20 C.^o *Mastigocladus* is in a state of latent life. These experiments partly prove the opposite of Loewensteins experiments.

35. HORVAT I.: Ein Beitrag zur Kenntniss der marginalen Filicineen. Österreichische botanische Zeitschrift, 1923.

A Contribution to our Knowledge of marginal Filicineae.

The author noticed characteristic swells of Schizeaceae on the membranes of prothallium on two species of a marginal representative of Mixtae namely on *Adiantum Bausei* and *Adiantum cuneatum*. The occurrence of the mentioned wells indicates according to the autor's opinion a relation between marginal Mixtae and Schizeaceae.

36. ŠKORIĆ V.: Prinosi poznavanju anatomije roda *Daphne*. Glasnik hrv. prirodoslovnog društva. God. XXXIV. Sv. 1. 1923.

Contributions to the Anatomy of Genus *Daphne*.

This paper deals particularly with the anatomical conditions of *Daphne Blagayana* and some other *Daphne-Species*. The author found in the intraxylar Phloems a primary bast, which can be exploited for systematic purposes. The necrosis of intraxylar Phloem is also of interest.

37. ŠKORIĆ V.: Periteciji hrastove medljike u Hrvatskoj. Šumarski list, 1923.

On the Perithecia of the Oak-Mildew in Croatia.

A description of the sudden appearance of perithecia in Croatia and their exact description. On the basis of a former description of the perithecia the author holds oak-mildew to be *Microsphaera alphi-toides* Griff. et Maubl.

38. VOUK V.: Die Probleme der Biologie der Thermen. Internationale Revue für Hydrobiologie Bd. XI. Heft 1—2, 89—99.

The Problems of the Biology of the Thermal Springs.

A lecture delivered at the Centenary of the German Society of Natural Scientist and Physicists in Leipzig in 1922. After a short historic introduction about the investigations of thermal springs the classification of biological principles is discussed. The chief problem of the Thermal Biology forms the so called »relics-hypothesis« i. e. the question whether certain cosmopolitic Thermal-Cyanophyceae are relics of primeval periods when the surface of the earth was still covered with hot waters. For the present it is impossible to answer this question, although certain physiological experiments speak decidedly against this relics-hypothesis. Having mentioned some important questions the author infers that the floristical researches conducted up to this time must be substituted by physiological investigations of thermal organisms.

39. PEVALEK I.: Prilog poznavanja epizojskih vrsta roda Characium. Glasnik hrvatskog prirodoslovnog društva. God. XXXIV. Sv. 1. i 2. god. 1923.

A Contribution to our Knowledge of the Epizoic Species of the Genus Characium.

A description of two *Characium* on Branchippus-lobsters found in the vicinity of Zagreb, of which one is described as *Characium Lamberti* and the other as *Ch. saccatum* var. *major*. *Characium Lamberti* appears in three varieties: var. *gracilipes*, var. *intermedia* and var. *setosa*.

40. GJURAŠIN STJ.: Dodatak flori Zagrebačke okolice. Glasnik hrv. prirodoslovnog društva. God. XXXV. Sv. 1. i 2. 1923.

A Supplement to the Flora of the Surroundings of Zagreb.

A List of new plants in the Flora of Zagreb.