Attachment 3

SUMMARY OF PROFESSIONAL ACCOMPLISHMENTS

Przemyslaw Baranow, PhD

Gdansk, 28.06.2023

1. Name

Przemyslaw Baranow

2. Diplomas, degrees conferred in specific areas of science or arts, including the name of the institution which conferred the degree, year of degree conferment, title of the PhD dissertation

2010, Gdansk	Faculty of Biology, The University of Gdansk, PhD degree in biology, thesis entitled "Taxonomic revision of *Polystachya* Hook. section *Polystachya* (Orchidaceae, Vandoideae)", supervisor - Prof. Dariusz Szlachetko
2005, Gdansk	Faculty of Biology, Geography and Oceanology, The University of Gdansk, Master's degree in biology, specialization: environmental biology, thesis title: "Revision of the subfamily Orchidoideae in Central Africa (Angola, Zambia and Zaire)", supervisor - Prof. Dariusz Szlachetko

3. Information on employment in research institutes or faculties/departments or school of arts

1 X 2011 - currently	research and teaching assistant professor, University of Gdansk, Faculty of Biology, Department of Plant Taxonomy and Nature Conservation
15 I 2009 - 30 VI 201	senior technician, University of Gdansk, Faculty of Biology, Department of Plant Taxonomy and Nature Conservation

4. Description of the achievements, set out in art. 219 para 1 point 2 of the Act

4A. Title of scientific achievement

Taxonomy and diversity of the neotropical genus *Sobralia* Ruiz & Pav. sensu lato (Orchidaceae)

4B. A series of published scientific articles forming the basis of the postdoctoral achievement

LP	**Publication**	**Ministry of Education and Science points of the journal in the year of article publication (according to Web of Science database)**	**Impact Factor/Quartile of the journal in the year of article publication (according to Web of Science database)**
H1	Szlachetko D., Kolanowska M., **Baranow P**.* (2013) *Sobralia quadricolor* (Orchidaceae), a new species from Costa Rica. Annales Botanici Fennici 50(6): 405-407, DOI: 10.5735/085.050.0606 My authorial contribution included: development of the concept of the paper, revision of herbarium materials, comparison of the taxon discussed in the paper with morphologically similar species, analysis of the literature, participation in the writing of the manuscript including the key for species identification, preparation of the figure, making corrections in accordance with the reviewers' suggestions, responses to reviews. My contribution is estimated at 40%	20	0,771/Q3
H2	**Baranow P**.*, Szlachetko D. (2013) *Sobralia pakaraimense* (Orchidaceae), a new species from Guyana. Annales Botanici Fennici 50(5): 347-350, DOI: 10.5735/086.050.0509 My authorial contribution included: conception of the paper, revision of herbarium materials, analysis of the literature, writing of the manuscript including the key for species identification, preparation of the figure, making corrections in accordance with the reviewers' suggestions, responses to reviews. My contribution is estimated at 80%	20	0,771/Q3
H3	**Baranow P**.*, Szlachetko D., Dudek M. (2014) New species of *Sobralia* section *Abbreviatae* Brieger (Orchidaceae) from Colombia: a morphological and molecular evidence. Plant	20	1,422/Q2

	Systematics and Evolution 300(7): 1663-1670, DOI:10.1007/s00606-014-0991-2 My authorial contribution included: development of the concept of the paper, revision of herbarium materials and living collections, analysis of the literature, writing the manuscript including the key for species identification, interpretation of the phylogenetic analyses results, making corrections in accordance with the reviewers' suggestions, responses to reviews, preparation of the figure used in the article. My contribution is estimated at 60%		
H4	**Baranow P**. (2015) Taxonomic notes on *Sobralia* section *Abbreviatae* (Orchidaceae) in Colombia, with description of a new species. Plant Systematics and Evolution, vol. 301(1): 41-60, DOI:10.1007/s00606-014-1053-5	20	1,361/Q2
H5	**Baranow P**.*, Szlachetko D. (2016). The taxonomic revision of *Sobralia* Ruiz & Pav. (Orchidaceae) in the Guyanas (Guyana, Suriname, French Guiana). Plant Systematics and Evolution 302(3): 333-355, DOI:10.1007/s00606-015-1266-2 My authorial contribution included: developing the concept of the paper, revising the herbarium materials, writing the manuscript including the key for species identification, making corrections in the manuscript in accordance with the reviewers' suggestions, responding to the reviews, preparing the figures used in the paper. My percentage contribution is estimated at 90%	20	1,239/Q3
H6	**Baranow P**. (2016) Proposal to conserve the name *Sobralia infundibuligera* against *Sobralia aurantiaca* (Orchidaceae). Taxon 65(5): 1176, DOI:10.12705/655.23	30	2,447/Q2
H7	**Baranow P**.*, Szlachetko D. (2017) Taxonomic study of the *Sobralia dorbignyana* complex	20	0,846/Q3

	(Orchidaceae). Nordic Journal of Botany 35(1): 38-44, DOI:10.1111/njb.01271 My authorial contribution included: development of the concept of the paper, revision of herbarium materials and living collections, analysis of literature data, writing the manuscript including the key for species identification, making corrections in the manuscript in accordance with reviewers' suggestions, responses to reviews, preparation of the figures used in the article. My contribution is estimated at 90%		
H8	**Baranow P**.*, Dudek M., Szlachetko D. (2017) *Brasolia*, a new genus highlighted from *Sobralia* (Orchidaceae). Plant Systematics and Evolution 303(7): 853-871, DOI:10.1007/s00606-017-1413-z My authorial contribution included: developing the concept of the paper, revising herbarium materials and living collections, compiling a database of morphological characters of the analyzed species, conducting and interpreting similarity analyses, interpreting phylogenetic analyses results, writing the manuscript and making corrections in accordance with reviewers' suggestions, responding to reviews, preparing the figure used in the article. My contribution is estimated at 70%	20	1,452/Q2
H9	**Baranow P**.*, Dudek M. (2018) *Sobralia fugax* (Orchidaceae: Sobraliae) - a new species from Colombia described on the basis of morphological study and phylogenetic analyses. Phytotaxa 372(4): 273-282, DOI:10.11646/phytotaxa.372.4.4 My authorial contribution included: developing the concept of the paper, revising herbarium materials and the living collection, interpreting the phylogenetic studies results, writing the manuscript and making corrections in accordance with the reviewers' suggestions, responding to reviews, preparing the figure and photographs used in the paper. My contribution is estimated at 70%	25	1,168/Q3

H10	Kolanowska M., Tsiftsis S., Dudek M., Konowalik K., **Baranow P**.* (2022) Niche conservatism and evolution of climatic tolerance in the Neotropical orchid genera *Sobralia* and *Brasolia* (Orchidaceae), Scientific Reports, Nature Publishing Group 12: 1-10, DOI:10.1038/s41598-022-18218-4 My authorial contribution included: developing the concept of the paper, revising herbarium materials and creating a database of species localities, interpreting the results of phylogenetic studies, climate niche modeling and analysis of the evolution of ecological tolerance, writing the manuscript and making corrections in accordance with the reviewers' suggestions, responding to reviews. My contribution is estimated at 40%	140	4,997/Q2
H11	**Baranow P**., Rojek J., Dudek M., Szlachetko D., Bohdanowicz J., Kapusta M., Jedrzejczyk I., Rewers M., Moraes A. (2022) Chromosome number and genome size evolution in *Brasolia* and *Sobralia* (Sobralieae, Orchidaceae), International Journal of Molecular Sciences 23: 1-17, DOI:10.3390/ijms23073948 My authorial contributions included: conception of the paper, revision of herbarium materials, interpretation of phylogenetic studies results, participation in writing the manuscript and participation in making corrections in accordance with reviewers' suggestions. My contribution is estimated at 20%	140	6,208/Q2
H12	**Baranow P**.*, Szlachetko D., Kindlmann P. (2023). Taxonomic revision of *Sobralia* section *Racemosae* Brieger (Sobralieae, Orchidaceae). Frontiers in Ecology and Evolution. 10. 1058334. 10.3389/fevo.2022.1058334. My authorial contribution included: conception of the paper, revision of herbarium materials, preparation of a key for	40	4,496/Q2

	species identification, preparation of a database with species localities and preparation of distribution maps, writing the manuscript and making corrections according to reviewers' suggestions, responses to reviews, preparation of figures. I estimate my participation at 80%.		

* the role of the corresponding author in articles published with other authors.

Total Impact Factor 2 year IF in the year of publication of the scientific achievement (H1-H12): **27,178**

Total ministerial points of scientific achievement: **515** points, including **195** points (scoring based on the list of the Ministry of Science and Higher Education dated January 25, 2017) and **320** points (scoring based on the list of the Ministry of Education and Science dated December 21, 2021).

4C. Description of the series of publications constituting the scientific achievement (H1-H12).

The problem of decline and the threats of biodiversity and the need of its protection according to the maintenance of natural resources has been one of the most discussed issues in recent decades. Today's rate of species extinction is about 1,000 times faster than it would be without the increasing human impact (Pimm et al. 2014, Vos et al. 2014, Pimm 2020). Its present rate allows us to conclude that we are witnessing a great extinction. Such phenomena have been observed several times in Earth's history, with the current one being the first one which is caused by unsustainable use of natural resources.

If considering the rate of decline in the number of species, it is impossible to doubt the necessity of study the diversity of the organisms and work on their classification. It is estimated that there are about 500,000 species of land plants on Earth. A significant part of them are taxa that are not known and described yet. As many as one-third of plant species are threatened with extinction (Corlett 2016). The importance of plants for the functioning of ecosystems is crucial, and from the point of view of economic importance, they are a fundamental source of benefits. At the same time, it is worth to mention that their significance remains poorly known. Therefore, it is difficult to understand why plants receive noticeably less attention in the context of protecting of their diversity than, for example, vertebrates.

One of the richest seed plant groups is the Orchidaceae family, which with its 30,000 species is second after the Asteraceae in terms of diversity. Orchidaceae family takes the great attention of botanists and growers, but is still considered as a group that needs the taxonomic study (Stinca 2022).

The family Orchidaceae is famous for its diversity visible both in morphological variation and adaptations for pollination by animals. The advanced pollination strategies such as pseudocopulation, trapping mechanisms in the flowers or mimicry that makes the flowers resemble carrion or decaying fungi is often observed.

These plants build strong relationships not only with pollinating animals, but also with mycorrhizal fungi. The fungus presence is essential in the germination of seeds, which are famous for their small, almost microscopic size, which is thought to be an anemochory adaptation. However, this results in lack of the nutrients supporting the developing seedlings. This deficiency is compensated for through seed infection by mycorrhizal fungi, which provide developing plants with nutrients. An extreme relationship with fungi was developed by achlorophyllous, mycoheterotrophic orchid species, which, adapting to light-poor habitats, developed the ability to gain all the nutrients they need from the mycorrhizal fungi.

Orchidaceae stand out from other plants in terms of their adaptation to a variety of habitats. They are observed not only as terrestrial plants, many of which are perennials adapted to function in areas where growing seasons alternate with periods of unfavorable conditions. Orchidaceae also have epiphytic forms among their representatives which are highly advanced in terms of adaptations to their habitat. These include the root-covering velamen, a layer of dead, empty, perforated cells that ensures efficient water uptake despite the lack of access to a moist substrate. In many species, there are also pseudobulbs or fleshy leaves, which give the plant the ability to store water and survive the dry season.

The adaptations to diverse conditions described above undoubtedly have an impact on the wide range of orchids. Except for Antarctica, they Orchidaceae representatives are present on all continents. They occur wherever conditions permit the presence of seed plants, with the greatest diversity of species observed in the tropics. This extremely extensive range of occurrence, together with the aforementioned outstanding number of taxa and their diversity, allow to conclude that Orchidaceae is one of the groups of plants that have achieved evolutionary success. Thus, the family is an extremely interesting object of diversity study in a broad sense - from mechanisms affecting species richness to threats. These plants, because of their strong relationships with other organisms, are highly sensitive indicators of environmental changes. The study of these processes is crucial from a conservation point of view. However, the basic step is to explore the diversity of species, to determine the degree of their variability and to elaborate their taxonomic classification.

One of the most numerous, most frequently observed and at the same time least known genera representing orchids in the New World is the genus *Sobralia* Ruiz & Pav. Since the description of this group (1794), some 200 taxa have been classified in an area extending from Mexico to Bolivia, with the greatest diversity of species in the Andes, especially in Colombia. The vast majority of *Sobralia* representatives are terrestrial plants, but epiphytes and lithophytes are also known. Their characteristic feature is their habit, rarely observed among orchids, resembling representatives of the Poaceae family rather than most of other Orchidaceae. The slender stems can reach an impressive size, often exceeding 3 m in height and in extreme cases up to 14 m. The leaf blades range from lanceolate to ovate in shape, are mostly hard, leathery, undulating along parallel nerves, and are set on short petioles transformed at the base into sheaths surrounding the shoot. An inflorescence grows at the top of the shoot and its structure is one of the main criteria used for the infrageneric classification. Currently, all representatives of *Sobralia* are characterized by terminal, unbranched inflorescence. Until recently, plants with lateral and branching inflorescence also belonged to the genus *Sobralia*. However, on the basis of the research described below, I have separated the aforementioned group from *Sobralia* in the rank of a separate genus - *Brasolia*. The flowers of these plants are showy, often exceeding 10 cm in diameter, and are intensely coloured, ranging from white, cream, yellow, pink to purple. Lip - the middle element of the inner whorl of the perianth, is very often distinguished by its colouration from the petals and sepals. In addition, it usually has thickenings on its surface, keels running along the nerves or hairs, and its edge is strongly crispate and irregular in many species. This has to do with the role of the lip, which, as in most orchids, is to attract the pollinators.

Sobralia, together with the genera *Elleanthus* C. Presl, *Sertifera* Lindl. & Rchb. f. and *Epilyna* Schltr. represents the tribe Sobralieae Pfitzer described in 1887. Common features of these genera are slender, reed-like stems, leaves undulating along the nerves and usually terminal inflorescence. The group has sometimes been considered as a subtribe Sobraliinae Schltr. and included in the tribe Arethusae Lindl. (Dressler 1981) or Epidendreae Humb., Bonpl. & Kunth (Dressler 1993). Szlachetko (1995), basing on clear differences in gynostemium structure, divided this group and classified *Elleanthus*, *Sertifera* and *Epilyna* into tribe Elleantheae Szlach. in subfamily Epidendroideae Lindl. leaving *Sobralia* in subtribe Sobraliinae, tribe Arethusae, subfamily Vanilloidae (Lindl.) Szlach. However, the development of molecular techniques and the consequent possibility of reconstructing phylogeny resulted in

the recognition of the aforementioned genera as a monophyletic group within the subfamily Epidendroideae (Pridgeon et al. 1981, Pridgeon et al. 2005).

The high level of morphological variability within *Sobralia* suggested the need to elaborate its infrageneric classification. So far, several divisions of the genus into informal groups or sections have been proposed. In 1853, Reichenbach distinguished two groups - *Eusobralia*, to which he included all species with a terminal inflorescence, and *Brasolia*, whose representatives produce both, terminal and lateral inflorescences. Lindley (1854) distinguished three groups - group 'A' included species with a conspicuous, naked inflorescence axis with small floral bracts. Group 'B' is characterized by an elongated, unbranched inflorescence axis, with leaf-shaped floral bracts emerging from the internodes. To the group 'C', the author classified species with a very shortened inflorescence axis with overlapping flower bracts forming a cone-shaped structure, without visible internodes. Reichenbach's classification became the basis for another division. Brieger (1983) distinguished two sections within *Eusobralia* - *Racemosae* Brieger grouping species with an elongated inflorescence axis and *Abbreviatae* Brieger with species with inflorescences with a very shortened axis covered by conically overlapping floral bracts. The author also described further sections - *Intermediae* Brieger grouping taxa with relatively small flowers and small, terminal inflorescences, and section *Globosae* Brieger, whose representatives are characterized by narrow, acuminate leaves, slender at the base gynostemium and a terminal inflorescence covered, as in *Abbreviatae*, by floral bracts, but in this case the structure elongates as more flowers are produced. A revision of Brieger's classification was used by Dressler (2002) for his elaboration which confirms the attempt. However, Dressler noted that the sections *Sobralia* and *Racemosae* should not be distinguished on the basis of inflorescence position because in *Sobralia*, in addition to the fact that lateral inflorescences are sometimes observed, it is not uncommon for them to grow apically as well. A constant differentiating feature, however, is the size of the floral bracts. Species of the nominal section produce bracts much shorter than the ovaries, while the representatives of the *Racemosae* section are characterized by large, leaf-shaped bracts that distinctly exceed the length of the ovaries. Dressler also noted that within the genus there are species (e.g. *S. luteola* Rolfe, *S. valida* Rolfe) and groups of species (e.g. *S. macrophylla* Rchb. f. complex and *S. undatocarinata* C. Schweinf. complex) that cannot be classified within any of the sections due to morphological differences.

A phylogenetic reconstruction based on the results of the phylogenetic study (Neubig et al. 2011) confirmed the distinctness of the above-mentioned sections, but it turned out that

the nominal section forms a paraphyletic clade that is more closely related to representatives of the genera *Elleanthus*, *Epilyna* and *Sertifera* than to other representatives of *Sobralia*. It confirms the morphological distinctness of the group if comparing with other species of *Sobralia*. A conclusion from these results is the need to divide the genus (Neubig et al. 2011).

Separating the nominal section of *Sobralia* in the rank of distinct genus would result in renaming the other species of the genus. For large and widely distributed taxa this could generate complications in the use of species names. In order to maintain nomenclatural stability, the Code of Botanical Nomenclature (Turland et al. 2018) gives the possible solution of such problem.

To avoid renaming about 150 species, Dressler et al. (2013) proposed replacing the type species for the genus (*S. dichotoma* Ruiz & Pav.) with a taxon belonging to a section other than the nominal one. The authors have decided to choose *S. biflora* as it was described at the same time as *S. dichotoma*. This step was necessary in order to elevate the type section to the status of a separate genus and, at the same time, leave all the other species that constitute the vast majority of *Sobralia* representatives without changing their names.

Despite taking the first steps towards revising the taxonomic status of the type section of *Sobralia*, the authors cited above have not completed the procedure. Perhaps the reason is that major changes must be preceded by a comprehensive revision of herbarium material, especially type specimens, as well as the protologues of the taxa representing the group.

The scientific achievement presented for evaluation describes the results of my research on *Sobralia s.l.* with using a broad spectrum of research techniques used in plant taxonomy. In the publications documenting the achievement, I presented the results of phylogenetic analyses, karyotype evolution or climate niche modelling and analysis of the evolution of ecological tolerance. However, the basis for conducting these studies and for interpreting their results was the morphological data I collected.

I examined 2003 herbarium collections, and 70% of the approximately 200 nomenclatural type specimens of the taxa described within *Sobralia*.

1. Nomenclatural problems at the species level within the genus *Sobralia*

- [H1] Szlachetko D., Kolanowska M., Baranow P. (2013) *Sobralia quadricolor* (Orchidaceae), a new species from Costa Rica. Annales Botanici Fennici 50(6): 405-407, DOI: 10.5735/085.050.0606

- [H6] Baranow P. (2016) Proposal to conserve the name *Sobralia infundibuligera* against *Sobralia aurantiaca* (Orchidaceae). Taxon 65(5): 1176, DOI:10.12705/655.23
- [H7] Baranow P., Szlachetko D. (2017) Taxonomic study of the *Sobralia dorbignyana* complex (Orchidaceae). Nordic Journal of Botany 35(1): 38-44, DOI:10.1111/njb.01271

Taxonomic revision is the analysis of the taxa representing the studied group, mainly in terms of morphological characters. However, it must be proceeded by the study of all the literature concerning the group, with a particular focus on protologues. Only the compilation of the literature data with the results of study of type collections allows to gain the knowledge necessary for the revision of all other herbarium collections, or specimens studied in the field. The end of the twentieth century was a time of intensive botanical exploration of the tropics, resulting in the accumulation of an enormous amount of herbarium material, as well as numerous discoveries of taxa new to science. However, the flow of information between researchers was not as efficient as it is today. As a result, current taxonomic revisions involve the verification of the status of some taxa. My research on *Sobralia* also included such procedures.

Known from Costa Rica, *Sobralia quadricolor* Endrés & Rchb. f. ex Szlach., Kolanow. & Baranow was discovered by A. R. Endrés and described by him together with H. G. Reichenbach. After examining the collections designated as *S. quadricolor* and the material representing the other *Sobralia* species recorded in Central America, I found that there are no doubts that the material deserves to be treated as representing a separate species. Endrés and Reichenbach pointed out a number of characters to distinguish *S. quadricolor* from other taxa previously described within *Sobralia*. They documented their discovery by leaving a handwritten note on the herbarium specimen and an illustration showing the perianth elements. However, a valid publication of the newly discovered taxon must be in documented as a publication (Article 29, point 1 of the International Code of Nomenclature for Algae, Fungi and Plants, Turland et al. 2018). In the publication I'm presenting, I have described and illustrated *S. quadricolor* in accordance with the requirements of the Nomenclature Code indicating the features that distinguish this taxon from the most morphologically similar species that share the distribution area with *S. quadricolor* [H1].

Another paper documenting the achievement [H6], I devoted to *Sobralia infundibuligera* Garay & Dunst. Its purpose was to preserve the name (Article 11 of the International Code of Nomenclature for Algae, Fungi and Plants, Turland et al. 2018) of this taxon. Based on a review of synonyms of a morphologically similar species - *Sobralia macrophylla* Rchb. f. - I found that one of them, *Sobralia aurantiaca* Linden & Rchb. f., represents not *S. macrophylla*, but *S. infundibuligera*. However, the most significant fact is that *S. aurantiaca* was described earlier than *S. infundibuligera* making it the priority name. However, taking into account that the species is known in the literature, herbarium collections or databases under the name *S. infundibuligera*, replacing it with another name could cause a confusion. In the article, I proposed to keep the name *S. infundibuligera* as valid, even though according to Article 11 of the International Code of Nomenclature for Algae, Fungi and Plants (Turland et al. 2018), *S. aurantiaca* is the oldest validly published name for this taxon.

Despite the numerous floras including *Sobralia* species were published in the past decades, my review of type specimens and protologues resulted in the discovery of a species that was confused with another taxon in all sources [H7]. The protologue of *Sobralia dorbignyana* Rchb.f. is detailed, but does not give information concerning the color of the flowers and describes their dimensions imprecisely. These missing data were completed by Kraenzlin (1906), but apparently this author based his observations on the material representing *S. semperflorens* Kraenzl. and wrongly described the flowers of *S. dorbignyana* as white. On the basis of an analysis of type collections, I discovered that *S. dorbignyana* has red flowers. Additionally, the review of other herbarium collections and living specimens resulted in the description of a new species within this group - *S. flava* Baranow & Szlach. with yellow flowers. The described species complex represented the type section of the genus and, together with its other species, I classified it into the genus *Brasolia* in the further publication [H8].

2. Analysis of taxonomic diversity of selected *Sobralia* groups

- [H3] Baranow P. (2015) Taxonomic notes on *Sobralia* section *Abbreviatae* (Orchidaceae) in Colombia, with description of a new species. Plant Systematics and Evolution, vol. 301(1): 41-60, DOI:10.1007/s00606-014-1053-5
- [H5] Baranow P., Szlachetko D. (2016). The taxonomic revision of *Sobralia* Ruiz & Pav. (Orchidaceae) in the Guyanas (Guyana, Suriname, French Guiana). Plant Systematics and Evolution 302(3): 333-355, DOI:10.1007/s00606-015-1266-2

- [H12] Baranow P., Szlachetko D., Kindlmann P. (2023). Taxonomic revision of *Sobralia* section *Racemosae* Brieger (Sobralieae, Orchidaceae). Frontiers in Ecology and Evolution. 10. 1058334. 10.3389/fevo.2022.1058334.

Taxonomic revision based on the analysis of the morphology of the studied group allows to collect information on the diagnostic features of each of the analyzed taxa. Comparing each revised collection to the data obtained from the earlier study of type specimens and to the literature data makes enable to verify whether it has been properly determined or to identify the underdetermined material. In the articles listed above, I have presented the results of such studies for a part of distribution area of the included taxa [H3, H5] or I presented the results of a complete revision of selected groups of species [H12]. I also proposed the descriptions of taxa new to science. An additional element included in the publications are the identification keys I have designed. This useful tool was previously available for the taxa a small part of taxa in the orchid floras of Peru (Schweinfurth 1958) or Ecuador (Garay 1978). In addition, I have described the morphological characteristics of the discussed species not in the form of descriptions only, but also by adding the original drawings, which I made based on the study of type collections or other most representative herbarium materials. I also included information on habitat preference and flowering season. I presented information on geographic distribution giving a list of examined specimens representing the species. In the case of a paper presenting the results of a taxonomic revision of the *Racemosae* section, I also made the distribution maps using the QGIS program (www.qgis.org/pl), which allows to present the localities on maps precisely.

3. New species described based on morphological and phylogenetic study results

- [H2] Baranow P., Szlachetko D. (2013) *Sobralia pakaraimense* (Orchidaceae), a new species from Guyana. Annales Botanici Fennici 50(5): 347-350, DOI: 10.5735/086.050.0509
- [H4] Baranow P., Szlachetko D., Dudek M. (2014) New species of *Sobralia* section *Abbreviatae* Brieger (Orchidaceae) from Colombia: a morphological and molecular evidence. Plant Systematics and Evolution 300(7): 1663-1670
- [H9] Baranow P., Dudek M. (2018) *Sobralia fugax* (Orchidaceae: Sobraliae) - a new species from Colombia described on the basis of morphological study and phylogenetic analyses. Phytotaxa 372(4): 273-282

As I mentioned above, the basis in plant taxonomy is the analysis of morphological data and the identification of the characteristic features of the species based on the data obtained during the analysis of the type collection and the information provided in the protologue. It allows to identify all other collections. The database of examined specimens of *Sobralia* and *Brasolia* provides a resource for making decisions about describing taxa that are new to science in case of handling with the collections that are clearly different from all species described so far. An example of a species that I have described based on such procedure is *Sobralia pakaraimense* Baranow & Szlach, which occurs in Guyana. [H2]. If there is a material for molecular studies available, it is recommended to support the morphological data with the results of phylogenetic analyses. In two of the papers I listed above [H4, H7], I propose new to science *Sobralia* species described basing on such procedure. In both cases, I showed a clear deviation in terms of morphological characteristics of the collections considered to be material representing unknown species. Including the specimens on the phylogenetic trees allowed to indicate the closest relatives of the new species. Phylogenetic studies were based on the variability of ITS and matK markers - widely used in analyses devoted to orchids and considered to be useful in the study of this group both for their level of variability and practical aspects of the work (Huyen-Trang et al. 2017).

4. New taxonomic treatment of the genus *Sobralia*

- [H8] Baranow P., Dudek M., Szlachetko D. (2017) *Brasolia*, a new genus highlighted from *Sobralia* (Orchidaceae). Plant Systematics and Evolution 303(7): 853-871, DOI:10.1007/s00606-017-1413-z

The results of my morphological studies confirmed the necessity of the division of *Sobralia* into two groups. I compiled a database including information on the morphological characters of *Sobralia* representatives. The results of similarity analysis based on UPGMA and neighbor-joining methods (Saitou and Nei 1987), allowed me to confirm the strong distinctiveness of the nominal section of *Sobralia*. This certainly has to do with a number of distinguishing features that set it apart from other species of the genus. Representatives of this section as the only ones may produce branched inflorescences that can arise laterally. They are also distinguished by small, scaly flower bracts, fleshy perianth elements, which are much more persistent than those of the remaining species of *Sobralia*. It should be noted, however, that I observed differences between the topology of phenograms showing the similarity and the topology of phylogenetic trees generated from the results of DNA variability analysis. In the

case of similarity analysis, the nominal section groups with most of the other representatives of *Sobralia*, while the *Racemosae* section shows more similarities with other genera of the tribe which is probably associated with the inflorescence structure. Basing on the phylogenetic analysis results which included more species than those preciously presented by other authors and was conducted using the variability of three molecular marker – nuclear Its and Xdh and plastid matK, I confirmed the distinctness of the nominal section of *Sobralia*. In addition, basing on these results, I noticed that this group is more closely related to the other genera of the tribe than to other *Sobralia* species. For each of the markers analyzed, their variation used for phylogeny analysis gave similar results.

The paper I'm describing here is the first attempt to compile the results of morphological analyses with the results of phylogenetic studies focused mainly on *Sobralia* (individual species of closely related genera are only a reference point for phylogenetic relationships within *Sobralia*). However, the most significant fact is that on the basis of my research I moved the nominal section of *Sobralia* to a separate genus. I gave it the name *Brasolia*, which was used for this group by Reichenbach when he recognized it as a section.

If following the suggestions that only monophyletic taxa should be considered (Hörandl 2006), I could assume that the nomenclatural changes I made are not appropriate and *Brasolia* should be included in *Elleanthus*. However, from a practical point of view, this is an unacceptable solution. Representatives of *Elleanthus* differ distinctly from *Brasolia* species - not only in the size of vegetative organs, inflorescence structure, flowers, but also in the pollination process, which in *Brasolia* is carried out by entomogamy, while in *Elleanthus* pollinia ere usually carried by birds, which is also associated with differences in the structure of the gynostemium.

5. Chromosome number and karyotype evolution analysis as a source of taxonomic information

- [H11] Baranow P., Rojek J., Dudek M., Szlachetko D., Bohdanowicz J., Kapusta M., Jedrzejczyk I., Rewers M., Moraes A. (2022) Chromosome number and genome size evolution in *Brasolia* and *Sobralia* (Sobralieae, Orchidaceae), International Journal of Molecular Sciences 23(7): 1-17, DOI:10.3390/ijms23073948

Following the principle saying that the more sources of taxonomic information used to create the classification, the more reliable it is (Stace 1993), it is necessary to use diverse and

wide spectrum of the taxonomic data sources to get the broad information concerning the studied taxa.

Another paper presented here describes the results of chromosome number analysis in *Sobralia* and *Brasolia* and shows the hypothetical evolution of the genome in representatives of these genera. Cytogenetic data, despite being considered as a source of potentially valuable information for classification (De Resende 2017), were very poor for the studied genera and included three species only. There was no information on genome size. After the publication of the article, data on the number of chromosomes of 23 species are known, and information on genome size was provided for 20 species. The information concerning the number of chromosomes for the genus *Sobralia* known from the previous publications was 2n = 48 and it was confirmed for nearly 40% of the species studied. However, it should be noted that variability in chromosome number was found in both *Sobralia* and *Brasolia*. The variability was observed as within one or few chromosomes and it was described as both aneuploidy (loss or gain of one or more chromosomes or chromosome segments relative to the established chromosome set for a specific genome) and dysploidy (rearrangement of DNA and chromosome fragments within the established chromosome set without significant loss or gain of DNA content, but with a change in the number of chromosomes) (Guerra 2008, 2012, de Storme and Mason, 2014). Ancestral reconstruction analysis revealed single chromosome loss and descending dysploidy as the main mechanism of chromosome change in Sobralieae (in addition to the genera studied, two taxa representing the closely related genus *Elleanthus* were also included). We demonstrated the contribution of descending dysploidy, with a reduction in the number of chromosomes from 2n = 48 (n = 24) to 2n = 46, 44, 42 in the genera *Sobralia* and *Brasolia*. Based on the genome size reconstruction of Sobralieae, I found that the genera *Brasolia* and *Sobralia* have similar genome sizes (similar 1C DNA value, i.e. DNA content in one non-replicating holoploid genome with n chromosomes, Greilhuber et al. 2005). From the point of view of classification it is important, that *Elleanthus* differs from *Sobralia* and *Brasolia* in this respect. By this part of the results I confirmed the previously described assumption saying that *Brasolia* and *Elleanthus*, although form a closely related clades on the phylogentic trees, cannot be compiled into one taxon.

6. Analysis of climate niches and the evolution of ecological tolerance

- [H10] Kolanowska M., Tsiftsis S., Dudek M., Konowalik K., Baranow P. (2022) Niche conservatism and evolution of climatic tolerance in the Neotropical orchid

genera *Sobralia* and *Brasolia* (Orchidaceae), Scientific Reports, Nature Publishing Group 12: 1-10, DOI:10.1038/s41598-022-18218-4

Ecological niche modeling conducted using the MaxEnt program (Phillips et al. 2004, Phillips et al. 2006) has revealed that, in general, the potential range of the species included in the analyses coincides with the actual recorded occurrence. Only individual locations of several species are outside the potential range, or the actual area of occurrence is slightly narrower than the potential one. Basing on the results, I found that for most species the factors determining the range of occurrence are the sum of annual precipitation and average annual temperatures. Analysis of the evolution of ecological tolerance showed that it does not correlate with the phylogeny of the studied genera. Closely related taxa are no more similar to each other in terms of preferred conditions than more distantly related ones. On this basis, I concluded that the factors analyzed did not determine or enhance the diversification of this group.

In the article I presented the first results of analysis of the diversification time of *Sobralia* and *Brasolia* based on the molecular clock method and obtained through the use of BEAST 1.83 (Drummond et al. 20012). I found that these genera form a relatively young group, which evolved 8.5-8 million years ago and the time of the most intense diversification of species took place about 2 million years ago. I put forward a thesis according to which, the determining factor in the intensification of diversification of these plants was the intensive radiation of bees from the Euglossini tribe (which are the main pollinating animals of *Sobralia* and *Brasolia*) that preceded it (5.5-2 million years ago) (Ramirez et al. 2010).

Summary

The scientific achievement presented for evaluation is focused on the results of a taxonomic study of the neotropical genus *Sobralia* and newly separated genus *Brasolia*.

I conducted a taxonomic revision basing on morphological studies of 2003 herbarium collections, including 140 type collections.

Using the results of phylogenetic studies based on the analysis of variation of ITS, matK and Xdh markers, I separated one section from *Sobralia* giving it the rank of a separate genus *Brasolia*. In addition, these results were used to conduct karyotype evolution and molecular clock analyses determining the time of diversification of the studied groups.

The achievement includes publications describing the results of the revision of selected groups in areas of their greatest diversity (Colombia, Guyana Highlands). In the case of the *Racemosae* section of the genus *Sobralia*, I published the results of a comprehensive revision

including distribution maps of all species, which are documented as the lists of examined specimens with detailed localities descriptions. In each of these papers, I proposed taxa new to science (9 in total) with their descriptions indicating that they represent species other than those known so far.

Basing on the results of the revision, I verified the definitions of taxa such as *Sobralia dorbignyana* and its related species and I published a paper preserving the name *Sobralia infundibuligera*. These are publications that systematize the knowledge about these taxa and sanction changes to ensure that botanists will avoid errors in understanding their definitions.

In the publications listed as the achievement, I also presented the results of systematizing knowledge on the type collections of the analyzed taxa. I identified 2 neotypes and 11 lectotypes for the species names *Sobralia* and *Brasolia*.

Sobralia and *Brasolia* undoubtedly require further research and supplementation of the revision results published so far with taxa not included in the works discussed here. I plan to continue to publish the collected data and present the revision of the section *Intermediae* of the genus *Sobralia*, which in its current form seems to be heterogeneous. In addition, I consider to give the sectional rank to informal groups - the *S. macrophylla* complex and the *S. undatocarinata* complex.

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5. Presentation of significant scientific or artistic activity carried out at more than one university, scientific or cultural institution, especially at foreign institutions

5A. Prior to obtaining a doctoral degree

I began my research on orchids during my master's studies conducting diversity analyses of the subfamily Orchidoideae in Central Africa. At that time I gained my first experience in morphological studies using herbarium collections. The obtained results were not only presented in my master's thesis, but also used in the study of the orchid flora of Central West Africa (Szlachetko et al. 2010). I also had the opportunity to participate in the process of describing taxa new to science for the first time (Szlachetko et al. 2009).

The object of my research conducted as part of my doctoral studies was the nominal section of the genus *Polystacha* Hook. The aim of the study was to revise the taxonomy of this group. Taking into account the extremely wide range of some of the section's species and the subtle differences between many of them, the research required the collection of extensive

material from the entire area of the distribution. In addition to morphological analyses, I also conducted molecular studies aimed at reconstructing the phylogeny of *Polystachya* section *Polystacha*. I presented the results in my doctoral dissertation and in several scientific articles (Baranow and Mytnik-Ejsmont 2010, Mytnik-Ejsmont and Baranow 2010). As one of the most significant achievements of the discussed research I consider the verification of the taxonomic status of *Polystachya concreta* (Hook.) Garay & Sweet and the recognition of *Polystachya tesselata* Lindl. as its synonym. *Polystachya concreta*, due to its pantropical range and high intraspecific variability, has more than 30 heterotypic synonyms. *Polystachya tesselata* recorded in Central and Southern Africa was until recently considered a separate taxon, but careful morphological studies and molecular studies have not revealed significant differences and allowed to conclude that there is no basis for treating African populations as a separate species. At the same time, I participated in work on the revision of the entire genus *Polystachya* (Mytnik-Ejsmont et al. 2011) and other orchid groups (Szlachetko et al. 2009).

I collected data for doctoral project in foreign institutions mostly - Museum National d'Histoire Naturelle in Paris (France) (funded by the Ministry of Science and Higher Education grant N N303 094734); Royal Botanic Gardens in Kew (UK) (funded by the Ministry of Science and Higher Education grant N N303 094734); Herbarium of the University of Copenhagen (Denmark) (funded by SYNTHESIS - the European Union-funded Integrated Activities grant - DK-TAF-40400, Naturhistorisches Museum in Vienna (Austria) (funded by SYNTHESIS - the European Union-funded Integrated Activities grant - AT-TAF-3903); Royal Botanic Gardens in Kew (UK) (funded by grant BW 14AO-5-0384-8); Nationaal Herbarium Nederland in Leiden, Utrecht and Wageningen (funded by SYNTHESIS - the European Union-funded Integrated Activities grant NL-TAF-2265).

I defended my doctoral thesis entitled "Taxonomic revision of *Polystachya* Hook. section *Polystachya* (Orchidaceae, Vandoideae)" on June 15, 2010. The thesis was awarded by the Council of the Faculty of Biology of the University of Gdansk.

I have conducted my research thanks to the SYNTHESYS grants mentioned above, a grant to the Department of Biology of the University of Gdansk for Young Scientists and a grant for PhD students of Polish Ministry of Science and Higher Education entitled "Taxonomic revision of the genus *Polystachya* Hook. section *Polystachya*" -N N303 094734.

During my doctoral studies I took part in the workshop "Molecular Phylogenetics" organized by "MBS" Service for Molecular Biology (23-25.X. 2008).

5B. After obtaining a doctoral degree

After the defense of my doctoral dissertation, in addition to starting research on the taxonomy of *Sobralia*, I was continuing my work on the elaboration of the orchid flora of Central West Africa (Szlachetko et al. 2015, 2021). In addition to conducting morphological studies using herbarium materials, I also had the opportunity to participate in field research (11-26.11.2011 - Cameroon - Bamenda Highlands - funded by the Ministry of Science and Higher Education grant N N303 343735). This experience allowed me to expand my skills related to the analysis of interspecific and intergeneric variability of orchids and also to study their habitat preferences and ecology. One of the results of the conducted research was the discovery of a species new to science - *Polystachya bamendae* Szlach., Baranow & Mytnik (Mytnik et al. 2009). I also had the opportunity to work on the revision of the definition of the entire genus *Polystachya* and become a co-author of the separation of one of the groups from it, which was distinguished as a separate genus *Neoburrtia* Mytnik, Szlach. & Baranov (Mytnik-Ejsmont et al. 2011). I was compiling the analyses of morphology with the results of phylogenetic studies based on variation in selected molecular markers. I have co-authored papers focusing on the interpretation of the results of phylogenetic analyses with morphological diversity analyses as a background (Mytnik-Ejsmont et al. 2019). The genus *Polystachya,* due to its pantropical distribution, is interesting in terms of plant migration and range changes due to climate warming. A paper analyzing these aspects using *Polystachya concreta* (Hook.) Garay & Sweet as a model was my first opportunity to conduct research focused on the topic. It compares the preferred climatic niches of *P. concreta* in South America, Africa and Asia and potential range changes in these three areas as a result of climate change (Kolanowska et al. 2020).

Conducting the research on the genus *Sobralia* has started my interest in the neotropical orchid flora. I have participated in projects aiming to the elaboration of the orchid floras of French Guiana (Szlachetko et al. 2012), the entire Guyana Highlands (Szlachetko et al. 2016) and Colombia which is the most diverse in terms of the number of Orchidaceae species (Szlachetko et al. 2020). I'm an author of the chapters devoted to the genera *Sobralia* and *Brasolia* in the monographs. I also dealt with the taxonomy of selected genera found in the Neotropics, including *Cleistes* Rich. Ex Lindl. (Szlachetko and Baranow 2012), *Cranichis* Sw. (Kolanowska et al. 2021), *Epistephium* Kunth (Szlachetko et al. 2013, Szlachetko et al. 2020), the complex *Lepanthopsis* (Cogn.) Ames - *Pteroglossa* Schltr. (Rykaczewski et al. 2017, Szlachetko et al. 2017), *Monophyllorchis* Schltr. (Szlachetko et al. 2014), *Ochyrella* Szlach. & R. González (Szlachetko et al. 2013), *Palmorchis* Barb. Rodr. (Szlachetko & Baranov 2013, 2014), *Ponthieva* R. Br. (Kolanowska et al. 2019), *Psilochilus* Barb. Rodr. (Szlachetko and

Baranow 2016), *Pterichis* Lindl. (Kolanowska et al. 2019), and *Triphora* Nutt. (Szlachetko et al. 2016).

The revision of *Sobralia* required some knowledge concerning other representatives of the tribe Sobralieae, hence part of my work describes the results of research on its genera - *Elleanthus* (Dudek et al. 2017, Kolanowska et al. 2017), and *Sertifera* (Baranow and Kolanowska 2019, Szlachetko and Baranow 2014). In the case of the latter genus, I have co-authored a comprehensive taxonomic revision including the division of the genus into sections.

I am currently preparing a monograph on *Sobralia* and *Brasolia*, which will be a compilation of the obtained results presented in the publications composing the scientific achievement described above with information on species that I have not included in previous publications. In order to obtain them, I reviewed materials deposited in the Herbario Nacional de Bolivia, the Universidad Mayor de San Andrés in La Paz (NCN Miniatura grant - 2018/02/X/NZ8/00282), the Universidad Nacional de Colombia in Bogotá (Ministry of Science and Higher Education grant - N N303 393033), Field Museum in Chicago (UG Department of Biology Young Investigator Grant - 538-L150-B232-16), Harvard University, Cambridge (UG Department of Biology Young Investigator Grant - 538-L150-B570-14), Missouri Botanical Garden in Saint Louis (UG Department of Biology Young Investigator Grant 538-L150-B050-13), Naturhistorisches Museum in Vienna (SYNTHESIS grant - the European Union-funded Integrated Activities grant - AT-TAF-5552), Muséum National d'Histoire Naturelle in Paris (SYNTHESIS grant - the European Union-funded Integrated Activities grant - FR-TAF-3472), Herbario de Real Jardín Botánico in Madrid (SYNTHESIS grant - the European Union-funded Integrated Activities grant - ES-TAF-2877) and at the Royal Botanic Gardens in Kew (UG Biology Department Young Scientist Grant 538-L150-0765-1). I also conducted research at the University of Gdansk, where I analyzed the collections loaned from the herbaria of Naturalis Biodiversity Center in Leiden, Botanischer Garten und Botanisches Museum, Freie Universität Berlin in Berlin, and The Natural History Museum in London. A significant part of the study of the variability of species, as well as gaining knowledge about their ecology, was conducted during the field observations I made during the abovementioned visit in Bolivia and during field research conducted in Peru (Oxapampa - Chachapoyas, 13.02-28.02.2016, funded by the Department of Plant Taxonomy and Nature Conservation of the Faculty of Biology of the University of Gdansk).

I am also currently compiling the results of a study on the variation of leaf epidermal structure in representatives of the tribe Sobralieae, which was one of the objectives of the "Miniatura" grant I completed (2018/02/X/NZ8/00282).

After receiving my doctoral degree, I participated in the workshops "Orchid species distribution models and their use in orchid conservation" and "Orchid seed and pollen: a toolkit for long-term storage, viability assessment and conservation" during the International Orchid Conference & Workshops for Young Scientists (Spała, 24-25. 09.2019) and in the course "Summer School of Taxonomy" (classical taxonomy, application of taxonomy in biogeography, molecular taxonomy) organized by the Department of Plant Taxonomy and Nature Conservation of the Faculty of Biology, University of Gdansk (Gdansk, 18-20.09.2018).

6. Presentation of teaching and organizational achievements as well as achievements in popularization of science or art

Teaching classes taught

- Evolution and systematics of seed plants and fungi, lecture (Natural Resources Conservation, 1st year, Bachelor)*.
- Evolution of seed plants, lecture (Biology, 1st year, Bachelor)*.
- Identification of seed plants, laboratory course(Natural Resources Conservation, 1st year, Bachelor)*.
- Presentation of research results, laboratory course (Natural Resources Conservation, 1st year, Bachelor)*.
- Biodiversity, lecture (Environmental Protection, 1st year, Master)
- Biodiversity conservation, lecture (Biology, 1st year, Master)*.
- Seminar (Biology, first year, Master)*.
- Basics of biology, laboratory course (Bioinformatics, 1st year, Bachelor)
- Project lab (PBL), laboratory course (Biology, 3rd year, Bachelor)
- Biodiversity and evolution, lecture (Bioinformatics, 2nd year, Bachelor)
- Evolution and systematics of seed plants and fungi, laboratory course (Biology, 1st year, Bachelor)
- Basics of biology, laboratory course (Nuclear safety and radiation protection, 1st year, Bachelor)

*courses currently being conducted

Research assistance in the preparing the bachelor theses

2020

- Species diversity of *Brasolia* (Rchb. f.) Baranow, Dudek & Szlach. and *Sobralia* Ruiz & Pav. in Bolivia - Aleksandra Mikolajczak

2017

- Analysis of the distribution of representatives of the genus *Myoxanthus* Poepp. & Endl. (Orchidaceae) - Aneta Reszczyńska

Scientific supervision in the preparing the master's theses

2022

- Materials for the taxonomic revision of the genus *Sobralia* Ruiz & Pav. (Orchidaceae) in Brazil - Wiktoria Wensierska

2021

- Predicting the impact of climate change on the range of selected species of Orchchidaceae in East Africa - Weronika Stefańczuk

2019

- Materials for taxonomic revision of the genus *Echinosepala* Pridgeon & M.W.Chase (Orchidaceae) - Aneta Reszczyńska

2018

- Materials for revision of the genus *Zosterophyllanthos* Szlach. & Marg. (Orchidaceae) In Colombia - Magdalena Staroń

2016

- Variation in leaf epidermal structure of representatives of the genus *Sobralia* Ruiz & Pav. (Orchidaceae) - Magdalena Rusiniak

2015

- Analysis of the distribution and ecology of species of the genus *Sobralia* Ruiz & Pav. (Orchidaceae) in the northern part of the occurrence (Mexico and Central America) - Malgorzata Banaś

- Analysis of the distribution and morphology of species of the genus *Sobralia* Riuz & Pav. of the *Sobralia undatocarinata* C. Schweinf. complex - Paulina Rożek

2014

- Analysis of the distribution and ecology of orchids of the genus *Sobralia* section *Racemosae* Brieger - Łukasz Wnuk

- Analysis of the distribution and ecology of species of the *Sobralia* section of the genus *Sobralia* Ruiz & Pav. (Orchidaceae) - Natalia Rohda

- Micromorphology of the flower variegation of *Sobralia* Ruiz & Pav. - potential importance in pollination process, possibility of use in intra-genus classification - Anna Szreder.

Other activity related to teaching activities

- In the academic year 2019/20, I conducted the Didactic Innovation Fund project (500/L150-S650-19) implemented at the Faculty of Biology, University of Gdansk, dedicated to teaching the basics of botany (course Evolution of Seed Plants, 1st year, bachelor, biology) using problem-based learning, case study and flipped education methods.

- 28.03.2014 – I participated in the 2nd Didactic Conference "Academic didactics: tradition and modernity" organized by the Educational Quality Team of the Faculty of Biology of the University of Gdansk.

Science popularization activities

- 14.01.2022 - lecture conducted as part of the Night of Biologists "Herbarium collections - preparing and use in the biodiversity research".

- 2022 - scientific consultant in the creation and presentation of the temporary exhibition "Klimaks" at the Emigration Museum in Gdynia, working on the topics related to threats to biodiversity.

- 2022 - currently - I am responsible for promoting activities in the project "Herbarium Pomeranicum - digitizing and making available the collections of herbaria of academic institutions of Pomerania by combining them and making them digitally accessible", implemented within the framework of the Operational Programme Digital Poland 2014-2020 carried out by the University of Gdansk, the Pomeranian Academy in Slupsk and the University of Szczecin. Among my duties, I give lectures during which I present the goals of the project (including a meeting with the Advisory Board of the Faculty of Biology of the University of Gdansk - 7.10. 2022, a meeting of the Pomeranian section of the Polish Botanical Society - 25.10.2022) and I participated in the creating of the exhibition "History of botanical collections" opened at the Faculty of Biology of the University of Gdansk on 14.04.2023.

Organizational activities

- 2020 - currently - Committee for Evaluation of Research Projects of Young Scientists 2022 member, Department of Biology, University of Gdansk.
- 2012 - 2020 - Council of the Faculty of Biology member, University of Gdansk

7. Apart from information set out in 1-6 above, the applicant may include other information about his/her professional career, which he/she deems important.

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