REVIEW

on the materials submitted for participation in a competition for "Associated Professor" in the field of higher education 6. Agricultural sciences and veterinary medicine, Professional field 6.5. Forestry, scientific specialty "Game Management", published in the State Gazette, No. 27/02.04.2021 and on the site of the University of Forestry on 23.03.2021.

Code FOR-Asp-0321-55.

Applicant: Dr. Stoyan Ivanov Stoyanov, Chief Assist. Professor

Reviewer: Prof. DSc Dimitar Petkov Pavlov, Professor in Professional field 6.5. Forestry, scientific specialty "Forestry, incl. Dendrology" at the University of Forestry, Sofia – retired.

1. Brief biographic data of the candidate

Dr. Stoyan Ivanov Stoyanov was born on 11.11.1972 in Yambol. He graduated the High school of Math in his hometown in 1990 with specialty Software developer. In 1995 he graduated the University of Forestry and received master's degree in Forestry. In 2013 he defended his thesis "Population ecology of golden jackal (*Canis aureus* L., 1758) in Bulgaria" and received PhD in Game Management. The CV of Eng. Stoyanov includes work in the State Forestry "Tundzha" in 1995-1997 as a specialist in charge of Game Management activities. From 1997 to present he has been successively Assistant Professor, Senior Assistant Professor and Chief Assistant Professor in Game Management in the Wildlife Management Department at the University of Forestry, Sofia. In 2010-2015 he attended several advanced training courses: specialized English language course, course for auditors in quality management systems in connection with the ISO requirements, courses in e-learning methods and systems, academic training methodologies, research methodologies activity, etc. Twelve certificates for completed courses are presented.

2. Correspondence of the submitted documents and materials of the applicant according to the Regulation for the Development of academic staff at the University of Forestry

The documents submitted by Dr. Stoyan Stoyanov show that the procedure for announcing the competition has been followed. The presented materials fully comply with the requirements of Article 60 of the Law for Development of Academic Staff in the Republic of Bulgaria, the Rules for its implementation, and the Regulation for the Development of Academic Staff in the University of Forestry, Sofia.

The assessment of the compliance of the indicators presented in the report with the minimum national requirements for holding the academic position "Associate Professor" shows:

Indicator A - The defended dissertation for the educational and scientific degree "PhD" provides the minimum requirements of **50 points.**

Indicator B - The developed monograph on "Population models" provides the minimum requirements of **100 points.**

Indicator Г - The eight articles and reports presented in the **Г7 group**, published in peer-reviewed and indexed scientific journals, with a reduction in the number of co-authors provide **141.23 points.**

The twelve articles and reports presented in the **Г8 group**, published in non-indexed journals with peer-review or in edited collective volumes, with a reduction in the number of co-authors provide **40.48 points.**

The scientific study presented in **Г9 group**, published by the candidate as a single author in peer-reviewed and indexed journal, provides **45 points.**

In total for the **group Г - Г7 + Г8 + Г9**, with minimum requirements of 200 points, **216.71 points** have been fulfilled.

Indicator Д13 – Presented 98 citations or reviews in scientific journals, peer-reviewed and indexed in worldwide databases of scientific information or in monographs and collective volumes, provide **1470 points.**

In the group Д14, presented 4 citations in monographs and collective volumes, provide **40 points.**

In the group Д15, presented 6 citations in non-indexed journals with peer-review, provide **30 points.**

In total for the group Д - Д13 + Д14 + Д15, with minimum requirements of 100 points, the candidate has indicated citations that provide **1540 points.**

Indicator Е – There are no minimum requirements for the academic position of "Associate Professor" on this indicator. The candidate scored 95 points from participation in research projects and a written handbook.

3. Assessment of the candidate's teaching activities

Dr. Stoyan Stoyanov is lecturer in Game Management, Hunting Tourist Resources and Park Fauna. He has been leading labs exercises in Game Management, Park Fauna and Wildlife Management. Dr. Stoyan Stoyanov is the author of the Course syllabus "Park Fauna" for students majoring in Landscape Architecture, Master's degree, full-time study. He co-authored the syllabus of the following courses: Game Biology and Diseases for Veterinary Medicine students, Master's degree, and Wildlife Management, according to the current curriculum of the students in Forestry, Master's degree. He has developed a course in Hinting Tourist Resources for the e-learning system of the University of Forestry.

In 2014-2017 he had taught the lecture course and labs in Game Biology and Breeding to Veterinary Medicine students with training in English, as a part of the course Game Biology and Diseases. He co-authored the handbooks "Game Birds and Mammals in Bulgaria", "The young hunter's book", "Information system of UHFB", etc.

Dr. Stoyanov has supervised 11 successfully graduated students. Since 2010 he has been a reviewer of 34 diploma theses.

4. Evaluation of the candidate's scientific, applied and publication activity

4.1. Participation in scientific, applied and educational projects

Assist. Prof. Stoyanov has participated in the scientific projects: "Alien terrestrial arthropods and their impact on biodiversity in Bulgaria (ATARTIB) 2009-2012", "Conservation genetics of rare plant and animal species" (in the framework of bilateral co-operation Slovakia – Bulgaria) in 2007-2009, and "Methods for big game population monitoring in Bulgaria", 2020, financing institution: Executive Forestry Agency.

He also took part in the educational projects "BG051PO001-4.3.04-0052. 2014-2015. Development of a centre for electronic forms of distance learning at the University of Forestry", with the financial support of the Operational Program "Human Resources Development", co-financed by the European Social Fund of the European Union, project manager: Prof. Dr. Veselin Brezin, and "BG05M2OP001-2.009-0034/2019 Support for the development of scientific capacity at the University of Forestry", with the financial support of the Operational Program "Science and Education for Smart Growth", co-financed by the European Social Fund of the European Union, project manager: Corresponding Member, Prof. DSc Ivan Alexandrov Iliev.

4.2. Characteristics of the publication activities

The total number of submitted publications for participation in the competition is 22, of which one monograph, one scientific study and 20 scientific publications. According to different indicators, they are divided into the following groups:

Importance: Articles and reports published in scientific journals, peer-reviewed and indexed in worldwide databases of scientific information with impact factor - 3; articles in peer-reviewed and indexed journals - 7; articles in non-indexed journals with peer-review - 4; publications in proceedings of national scientific conferences - 1; publications in proceedings of international scientific forums - 6.

Place of publication: Monograph published in Bulgaria - 1; Articles in foreign journals - 5; Papers in proceedings of international scientific forums - 7; Articles in national scientific journals - 8; Papers in proceedings of international scientific conferences - 1.

Language in which they are published: Bulgarian - 4; Foreign language - 18.

Number of co-authors: single author - 6; with one co-author - 4; with two co-authors - 3; with three and more co-authors - 9.

The contributions in the presented works are in the following directions:

1. Application of population models for analysis and assessment of the impact of hunting on demographic structure, population dynamics and viability of wildlife populations, and for testing different scenarios of game harvest management on short-term and long-term population dynamics (B3.1).

2. Studies on the grey partridge population ecology (Г8.1 and Г8.2). Estimating the relationship between climatic factors, insect food and partridge population size, as well as the impact of modern farming on population density.

3. Studies on the population ecology of grey wolf, golden jackal and red fox (Г7.1, Г7.2, Г8.5, Г8.10), and the key factors determining their population dynamics and environmental interactions between them, including suppression and competitive exclusion.

4. Taxonomic and morphometric studies on jackals in Europe, Asia and North Africa (Г7.7, Г7.6, Г7.7, Г8.11, Г9.1).

5. Anatomical and histological research on the wolf and golden jackal (Г8.8, Г8.9).

6. The ungulate game impact on the tree vegetation (Г8.3).

7. Research on brown hare density (Г8.6) and on survival rate and dispersion after release of farm reared common pheasants, chukar partridges, and grey partridges (Г7.3, Г7.4, Г8.7).

8. Wildlife monitoring (Г8.12) and development of a model of an information system for hunting statistics (Г8.4).

4.3. Reflection of the candidate's scientific activity in the literature (citation rate)

The results of the candidate's research have found a wide response. The applicant has found 98 citations of 7 of his articles in scientific journals, peer-reviewed and indexed in worldwide databases of scientific information or in monographs and collective volumes, 4 citations in monographs and peer-reviewed conference proceedings, and 6 citations in non-indexed journals with peer-review.

The most cited article (48) is (Г7.2): Top predators constrain mesopredator distributions. *Nature Communications*, 8, 1-7,.2017. doi:10.1038/ncomms15469 ISSN: 2041-1723 (online) (Web of Science, Scopus). Many citations (19) of article on PhD thesis also have been found - Stoyanov, S. (2012) Golden jackal (*Canis aureus*) in Bulgaria: Current status, distribution, demography and diet. International symposium on hunting, "Modern aspects of sustainable management of game population", Zemun-Belgrade, Serbia, 22–24 June 2012, 48–56. ISBN: 978-86-7834-153-3.

4.4. Contributions of the candidate's works (scientific and applied)

After a summary analysis of the presented scientific production, as the most significant I evaluate the following contributions of the candidate, which are grouped in several areas:

Original scientific contributions.

The population ecology of the grey partridge and the influence of the climate and the presence of insect food on the population dynamics were studied (Г8.1, Г8.2). It has been proven that insect food significantly affects the dynamics of partridge stocks. The results are consistent with the hypothesis that the new chemicals used are not themselves mortally toxic to the grey partridge or its chicks, but it is that their use in modern farming methodology still has the same significant effect of breaking the crucial early chick nutrition (Г8.1). It has been proven that the temperature, precipitation, duration of sundial, air humidity and snow cover were the most highly correlated with the partridge population size (Г8.2).

As a significant contribution to the golden jackal taxonomy, I define the results of the first comprehensive analysis on a wide scale of golden jackal skull morphometry by analysis of an extensive morphometric data of jackal skulls from Europe, Asia Minor, and North

Africa (Г9.1). The study supports the hypothesis that at least two different taxa of genus *Canis* occur in North Africa.

There was proposed the hypothesis that wolf extermination could be the key driver that enabled the expansion of jackals throughout Europe. It was suggested that the range expansion of golden jackals was triggered by intensive persecution and resulting decline of the apex predator, the grey wolf (*Canis lupus*) (Г7.1, Г7.2).

Scientific contributions in the field of "Enrichment of scientific knowledge".

Based on a comparison of the population dynamics of the golden jackal and the red fox in Bulgaria, Romania, Serbia, Croatia, Austria, and Hungary, referring to the conditions of jackal range expansion in Europe, the hypothesis of the existence of the golden jackal competitive exclusion or suppression effect on red foxes was rejected (Г8.10).

It is hypothesized that the changes in forests and their structure for more than 50 years favored the wolf population by extending habitats and creating natural links between different locations. The hypothesis was confirmed by the presence of a correlation between the wolf population size and the density of its main prey, the ungulate game species. The trends in wolf hunting bags were consistent with the population dynamics of red deer, roe deer and wild boar (Г8.5).

Comprehensive craniometric and morphometric characteristics of the golden jackal in Bulgaria and Europe were presented (Г7.5, Г7.6 and Г8.11). Geographic variation and sexual dimorphism in skull and body size and shape among golden jackal population in Bulgaria was studied. It is proven that the golden jackal in Bulgaria shows considerable individual variability but weak intrapopulation differentiation. The data was compared with the jackal population in Austria and Hungary (Г8.11).

In co-authorship with a research team the microscopic anatomy and histological structure of the grey wolf and the golden jackal stomach wall were studied (Г8.8 and Г8.9). The similarity with the other members of the Canidae family was shown. It was found that the mucosal layer stratum compactum was not present in the wolf and golden jackal stomach, although they usually exist in felid species (Felidae).

A new high altitude nesting site of white stork in 2014-2019 in Yundola village at 1390 m a.s.l. was found. This is one of the highest nesting sites of the species in Bulgaria (Г7.8). The first successful nesting was in 2016.

Methodological contributions

The red deer population was taken as an example of applying matrix population models and adaptive harvest management. The proposed matrix population model for red deer population was applied to simulate short and long-term population dynamics. The model structure and parameters could be changed for simulating different scenarios. The model could be applied for other game species, as well (B3.1).

By applying stochastic population models and simulations, different approaches to harvest of game populations were tested and their impact on population dynamics of game species was analyzed in the framework of adaptive harvest management (B3.1).

An original method for estimating the population size of jackals and other game species by comparing the data from the hunting statistics and the population demographic structure is proposed (Г8.12). A guidance on estimation of abundance and density of wild carnivore populations was proposed in the framework of ENETWILD international scientific initiative. It was recommended developing a permanent network and a data platform to collect and share local density estimates, so as abundance in the EU, which would enable to validate predictions for larger areas by modelling.

Applied contributions

The brown hare population density in the plain habitats in Bulgaria, located below 600 m above sea level, has been estimated for the period 2010 – 2013, and recommendations for improving the census methods, proper management, harvest plans and protection of the brown hare population in Bulgaria were proposed (Г8.6).

The survival rate and dispersion after release of farm reared common pheasants, chukar partridges and grey partridges were studied by applying radiotelemetry (Г7.4, Г8.5, Г8.7). It has been shown that spring release must not be a preferred method for releasing of farm reared game birds. Habitat quality was proven to be a key factor in the survival of released birds (Г7.4).

Survival rate and dispersion of released rock partridges (*Alectoris graeca* (Meisner, 1804)) in typical habitats in "Vrachanski Balkan" Nature Park were studied during the reintroduction program (Г7.3). It was shown that the survival rates of birds did not depend on their sex and age.

The ungulate game species impact on the tree vegetation in the plain deciduous forests of Northeastern Bulgaria was studied (Г8.3). The most significant damages of the red deer on *Quercus sp.* by biting of their apical and lateral shoots were caused in winter. Plastic bags were proven to be the most efficient mean in protecting the apical shoots.

A model of an information system for hunting statistics has been developed (Г8.4). Based on the model, an information system for the Union of Hunters and Fishermen in Bulgaria has been proposed, as well as a user guide to be used for possible implementation in the system (Г8.4).

New criteria for awarding medals to golden jackal trophies were suggested and justified based on statistical analysis of an extensive morphometric data of jackal skulls from Bulgaria and Romania (Г7.7).

As applied contributions I appreciate the written 8 independent popular science articles published in the magazines Hunting and Fishing, Photo Hunt and Forest.

5. Evaluation of the personal contribution of the candidate

The personal contribution of Dr. Stoyanov is clearly outlined in his individual publications. In the collective publications of which the candidate is the first author, I appreciate his leading

role. In the publications in which he is second, third or subsequent co-author, I believe that his participation is equal, including in publications with more than 4 authors, as he participates with a significant number of authorial research in the processed data sets.

6. Critical notes and recommendations

1. The presented contributions could be summarized, as some of the scientific contributions have a certain applied significance.
2. I recommend to the candidate in his future scientific and educational activity to focus on generalizing fundamental research and to take over the scientific supervision of doctoral students in the third level of education.

7. Personal impressions

My personal impressions of the applicant are from his student years and as a lecturer at the University of Forestry. With wide interests in many fields, he manifests himself with his organization and depth in the acquisition of knowledge, in the teaching of students and in scientific research. His organizational skills and fellowship in the teamwork are a prerequisite for participation in international teams and for achieving significant scientific and applied results.

8. Conclusion

The presented scientific work in specialized scientific journals, the scientific and applied contributions in the fields of "Game Management", "Game Breeding", "Ecology" and "Biodiversity conservation", which have found a wide response in the scientific community, the expert activity in implementation of national and international projects, give grounds to express a high opinion of the applicant's overall activity. He far exceeds the minimum national requirements for the academic position of "Associate Professor" set out in the Law for Development of Academic Staff in the Republic of Bulgaria, the Rules for its implementation, and the Regulation for the Development of Academic Staff in the University of Forestry.

This gives me a ground to confidently suggest the candidate Assist. Prof. **Dr. Stoyan Ivanov Stoyanov** to occupy the academic position **"Associate Professor"** in **the field of higher education 6. Agricultural sciences and veterinary medicine, Professional field 6.5. Forestry, scientific specialty "Game Management".**

24.08.2021 г.

Reviewer:

(Prof. DSc Dimitar Pavlov)