REVIEW

AFPAPER VHMBERCATET гр. Пловдив BX. Nº #OPG ARIO Nº 20 Получено на 04.05 2022

Prepared by Prof. Dr. Zarya Vasileva Rankova from the Fruit-Growing Institute, Plovdiv, a member of the Scientific Panel in accordance with Order No. RD-16-148 of 28 February 2022 of the Rector of the Agricultural University – Plovdiv, referring to the Competition for the academic position of an Associate Professor in the Area of Higher Education: 6. Agricultural Sciences and Veterinary Medicine; Professional Field: 6.2. Plant Protection, (Weed Science), announced in SG No. 110 of 24.12.2021. Applicant: Chief Assist. Prof. Dr. Mariyan Yanev Yanev from the Agricultural University – Plovdiv

Brief presentation of the applicant

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Chief Assist. Prof. Dr. Mariyan Yanev Yanev was born in 1985 in Svilengrad. He graduated from the Agricultural University – Plovdiv in 2009, obtaining a Master's degree in the Master's programme 'Plant Protection'. In 2016 he acquired the Educational-and-Scientific degree 'Doctor' in the professional field 6.2. Plant Protection (Weed Science). In 2016 he took the academic position of an Assistant Professor and from 2018 - a Chief Assistant Professor at the Department of Farming and Weed Science.

General Description of the Scientific Production 1.

Chief Assist. Dr. Mariyan Yanev participates in the competition for the academic position of an Associate Professor with a total production of 37 scientific works, grouped as follows:

In journals with impact factor and impact rank -3;

- Scientific publications in journals referenced and indexed in world-famous databases with scientific information -25;

- Scientific publications in non-refereed peer-reviewed journals or in edited collective volumes -7:

- Published monograph on the basis of a defended PhD Thesis for awarding the Educational-and-Scientific degree 'Doctor' or for awarding the scientific degree 'Doctor of Science' -1:

- Published university manual or a manual used in schools - 1.

The presented individual reference for compliance with the National Minimum Requirements shows that the applicant covers, and, according to some groups of indicators, even exceeds the minimum number of points required for the academic position of an Assoc. Professor under Art. 2b, para. 2, 3 and 5 of the Act on the Development of the Academic Staff in the Republic of Bulgaria and Annex to Art. 1a of the Regulations for the Application of the Act.

The presented scientific publications in the competition for the academic position of an Associate Professor show that the applicant is the only author of 1 publication, the first author of 1 publication, the second author in 16 publications and in the rest he is the third or next author.

The research investigations of Chief Assist. Prof. Dr. Mariyan Yanev are in the field of integrated weed control systems for the major field crops, focused on the following areas:

1. Species composition, dynamics and harmfulness of weed associations in major field crops (wheat, maize, sunflower, rapeseed and chickpeas).

It was found that the agrocenosis of wheat and rapeseed is dominated by species from the group of early spring, winter-spring and ephemeral weeds, and in maize and sunflower – early spring and late spring weeds. The harmfulness of the weed associations was investigated, as follows: in wheat (Enola and Avenue cultivars) for the region of Plovdiv, Kubrat and General Toshevo, in rapeseed (hybrids PX 100 CL, PX 111 CL, PT 228 CL, PT 200 CL) for the agro-ecological conditions of Plovdiv and Yambol region, in maize (hybrids Knezha-613, Florence, P1114, P9241, P9900, P0023) for the agro-ecological conditions of Plovdiv and Knezha and in sunflower (hybrids ES Candimis CL Plus, PR64 LE25, P64 LL125, Lucia CLP, SY Bacardi CLP, SY Diamantis CL) for the agro-ecological conditions of Plovdiv and Sliven regions. The harmfulness of the weed associations in chickpeas, cv. Plovdiv 8, was also studied.

2. Weed Control in Wheat

The biological efficiency and selectivity of a large number of soil and foliar herbicides, applied alone or in a combination, were studied under the conditions of field experiments: metsulfuron-methyl + thifensulfuron-methyl; tribenuron-methyl + thifensulfuron-methyl; fenoxaprop-P-ethyl; clodinafop; pinoxaden; amidosulfuron + iodosulfuron; tritosulfuron + florasulam; florasulam + aminopyralid-potassium; 2.4 D ester; pyroxulam, mesosulfuron + iodosulfuron; metsulfuron-methyl + tribenuron-methyl + florasulam, metsulfuron-methyl + tribenuron-methyl + florasulam, metsulfuron-methyl + tribenuron-methyl + florasulam, metsulfuron-methyl + tribenuron-methyl + florasulam; fluroxypyr; 2,4 D ester + florasulam, etc. A high selectivity of Ergon WG, applied at the double rate of 18 g/dka in wheat, Enola cv., was established. The effect of the applied herbicides and herbicide combinations on the growth, development and structural elements of the yield was analyzed. High yield (5.78 t/ha) was obtained in the variant with a combined application of Palace 75 WG + Derby Super WG. The herbicide combination Secator + Puma Super controlled 90.0% of the broad-leaf and 100% of the grassy weeds and the highest grain yield of 6.55 t/ha on average for the period was obtained from wheat of Avenue cultivar.

3. Weed Control in Maize

The biological efficiency and selectivity of a large number of soil and foliar herbicides, applied in maize alone or in a combination, were studied under the conditions of field experiments: nicosulfuron; fluroxypyr; florasulam; mesotrione; isoxaflutol + terbuthylazine; isoxaflutol + ticarbazone-methyl; mesotrione + S-metolachlor + terbuthylazine; mesotrione + nicosulfuron; mesotrione + nicosulfuron + rimsulfuron; dicamba + nicosulfuron + rimsulfuron; tembotrione + thiencarbazone-methyl; mesotrione + terbuthylazine; mesotrione + terbuthylazine; mesotrione + clomazone; s-metolachlor + terbuthylazine. Their effect on the yield was monitored and compared to the economic control, the highest yield being obtained after the application of the herbicidal combination of s-metolachlor and nicosulfuron.

Three maize hybrids (P9241, P9900 and P0023) grown at different plant densities (40000, 46000, 56000, 69000 per ha) under non-irrigation, were investigated. The aim of that

study was to evaluate the effect of the sowing density on the growth and yield of themaize hybrids. The highest yield from all the three hybrids was obtained at a sowing density of 69000 plants per hectare.

4. Weed Control in Rapeseed

Growth and development of the plants after treatment with metazachlor, metazachlor + dimethenamid-P, cycloxidim, propakizafop, fluazifop-P-butyl, etametsulfuron-methyl, clopyralid + picloram + aminopyralid, bifenox, etc., were studied. The effect of imazamox-containing herbicides on the plant height, the number of branches per plant, the number of fruits per plant, the length of the central rapeseed fruit and the biological rapeseed yield was established in hybrid PT 200 CL.

A very good result was found in the control of fescue after treatment with the herbicide Butisan 400 SC. A very good efficacy against the weed was achieved after the application of the herbicide Cleranda at the rate of 150 - 200 ml/da in Clearfield technology. The results showed that three of the herbicides registered against grassy weeds in rapeseed – Stratus Ultra, Fusilade Forte and Agil, were not efficient against fescue, regardless of the applied rate and the time of treatment. The only vegetative herbicide showing very good results, proved to be Cleranda.

5. Weed Control in Sunflower

The effect of a number of herbicides on sunflower yield (imazamox, diflufenican, tribenuron-methyl, flumioxazine, s-metolachlor + terbuthylazine, dimethenamid-II) was studied. The improved 'Clearfield Plus' technology was also investigated. It was found that the single use of the herbicide Pulsar 40 at the rate of 125 ml/da showed the same efficacy against some more difficult to control weeds as that of Pulsar applied at the rate of 80 ml/da together with 80 ml/da of the adjuvant Desh. Diflufenican (Pelican 50 SC), used in a combination with the biostimulant Amalgerol and the foliar fertilizers KTS and High-phos, increased the yield and the oil content of sunflower seeds.

6. Efficacy and Selectivity of Herbicides in Chickpeas and Pumpkins

A field experiment was conducted with chickpeas, Plovdiv cultivar, with the aim of evaluating the efficiency and selectivity of 7 active substances of herbicides – dimethenamid-P, pendimethalin, linuron, imazamox, imazamox + bentazone, bentazone and cycloxidim. The highest efficiency was reported in the variant treated with Corum SL + Desh at the rates of 1.25 + 0.625 l/ha. The highest phytotoxicity was registered in the variant with Bazagran 480 SL + Stratos Ultra, applied at the rates of 2.0 + 2.0 l/ha.

The selectivity of the soil herbicides s-metolachlor, pendimethalin and dimethenamid-P in pumpkins was established under the conditions of a pot experiment.

7. Ecology and Control of Parasitic Weeds

The development of the species *Orobanche cumana* Wallr. in sunflower was studied under different agro-ecological conditions. It was established that in the regions of North-Eastern and South-Western Bulgaria the predominant race of the parasite was 'H' and in South-Eastern Bulgaria – race 'E'.

The development of the parasitic weed *Phelipanche ramosa* (L.) Pomel in rapeseed was studied. The biological efficiency and selectivity of imazamox-containing herbicides and the stages of their application in sunflower and rapeseed for parasite control were analyzed. Changes in the yield, the absolute and hectolitre weight of sunflower (Lucia CLP hybrid) and the change in plant height, seed yield, absolute weight and oil content in rapeseed (PT 228 CL hybrid) were established.

8. Allelopathic Manifestations of Parasitic Weed Species

It was proven that the parasitic weed species of *Orobanchaceae* family (Ph. Ramosa, Ph. Mutelii and Ph. Spp.) show a significantly stronger allelopathic effect compared to the applied concentrations of aqueous extracts of the species of *Convolvulaceae* family. The effect of aqueous extracts of *Cuscuta epithymum* L., *Cuscuta campestris* Yuncker, *Phelipanche ramosa* (L.) Pomel, *Phelipanche mutelii* (Schultz) Reuter and *Phelipanche spp.* applied at the concentrations of 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8% w/v, was studied, and it was found that they had a relatively high inhibitory effect on seed germination of *Lactuca sativa* L., Great Lakes cv.

9. Studies on the Effect of Herbicides on Soil Microbiological Activity

The effect of a number of herbicides (dimethenamid-P + pendimethalin, benfluralin, metazachlor, s-metolachlor and isoxaflutole) on actinomycetes, ammonifying and immobilizing mineral nitrogen microorganisms and nitrogen-fixing bacteria was studied. The period of adaptation of the trophic groups of microorganisms after the application of various herbicides was established.

As a result of the overall research activity of the applicant, **10 scientific-and-applied contributions** are confirmed. The most significant of them are those **original in character**, which provide new information on the herbicidal efficiency of some active substances and combinations against some economically important weed species in Bulgaria in areas planted with the major field crops. I also admit as original contributions those related to the study of the ecology and control of parasitic weeds and their allelopathic behaviour.

I accept that the contributions are personal findings of the applicant and I should note that they bring new and important information in the further development of existing scientific problems, i.e. efficient and environmentally friendly weed control in major field crops based on in-depth research studies on the efficiency and selectivity of the herbicides and their impact on soil microflora.

Citations of the scientific publications

The scientific works of Chief Assist. Prof. Dr. Mariyan Yanev were cited in seven scientific publications:

- in Bulgarian scientific journals – 1;

- in Bulgarian and foreign scientific journals, with IF, indexed and referenced in various databases (Web of Science, Scopus) - 6.

Participation in research projects and tasks

Chief Assist. Prof. Dr. Mariyan Yanev has participated in the implementation of four research projects.

Participation in international and national scientific forums

Chief Assist. Prof. Dr. Mariyan Yanev has participated in important scientific forums both in our country and abroad (Romania, Bosnia and Herzegovina, Croatia).

Assessment of the teaching activity of the applicant

Chief Assist. Prof. Dr. Mariyan Yanev, along with his research work, has a significant experience in teaching. It is evident from the attached certificate from the Agricultural University – Plovdiv that for the period 2016-2021, the applicant taught 2239 academic hours to Bachelor and Master degree students.

Personal impressions and recommendations

I do not find any significant faults in the research activity of the applicant, which would have an eventual effect on the evaluation results and the conclusions made.

Conclusion

At the announced competition for the academic position of an Associate Professor in the Scientific Major 'Weed Science', Professional Field 6.2. Plant Protection, the only applicant Chief Assist. Prof. Dr. Mariyan Yanev has presented scientific papers in sufficient quantity and quality. The topics of the his research are particularly relevant and cover a wide range of research – studying the species composition and harmfulness of weed associations, optimizing the systems for integrated weed control in major field crops, study on the biology and ecology of dangerous parasitic weed species in sunflower and rapeseed and their allelopathic behaviour. The scientific and scientific-and-applied contributions in the publications are a novelty for science and they enrich the existing knowledge.

The research publications presented by Chief Assist. Prof. Dr. Mariyan Yanev in the competition confirm that he is an established researcher in the field of weed science and modern integrated systems for weed control in major field crops. According to the criteria for the scientific and metric indicators, the applicant fully meets the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria and the Regulations of the Agricultural University – Plovdiv for taking the academic position of an Associate Professor.

Chief Assist. Prof. Dr. Mariyan Yanev has in-depth knowledge in the field of modern methods of weed control, statistical methods, he uses freely and interprets correctly the scientific literature and the results obtained.

All that gives me the reason to evaluate POSITIVELY the applicant and to recommend to the honourable members of the Scientific Panel to vote POSITIVELY and Chief Assistant Professor Dr. Mariyan Yanev Yanev to be elected as an ASSOCIATE PROFESSOR in Professional Field 6.2. Plant Protection, Scientific Major 'Weed Science' (Herbology).

April 7, 2022

Prof. Dr. Zarya Rankova