



ICAR-DPR NEWS

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ICAR-DPR celebrates 33rd Foundation Day

The Directorate celebrated the 33rd Foundation Day on 1st March 2020. Dr. B. N. Tripathi, Deputy Director General (Animal Science), ICAR, New Delhi graced the occasion as the Chief Guest. During his speech, he lauded the contribution of ICAR-DPR in the improvement of poultry production in the country, particularly the backyard poultry production through dissemination of improved chicken varieties throughout the country. Dr. Tripathi highlighted the need for giving importance to research in the areas of precision farming, trans-disciplinary research and use of artificial intelligence for further improvement in productivity of poultry farming. On this occasion, Dr. Tripathi released a booklet entitled "Production of low cholesterol chicken: A biotech intervention" authored by Dr. T.K. Bhattacharya et al. He also distributed the prizes to winners of the games and sports competitions organized for the staff of the Institute.



Dr. B. N. Tripathi giving away prizes



Dr. B. N. Tripathi releasing the book



Dr. B. N. Tripathi lighting the lamp



Addressing the staff

Shri. P. Venugopal Reddy, Chairman, Ekalavya Foundation, Hyderabad participated in the program as the Guest of Honour. He emphasised the need for collaboration of different stake holders to realize the goal of doubling of farmers' income through interventions in animal husbandry activities, particularly in backyard poultry rearing in order to

diversify and improve the source of income of the farmers. Dr. S. Vaithyanathan, Director, ICAR-NRC on Meat, Hyderabad also graced the occasion as the Guest of Honour.

Dr. R. N. Chatterjee, Director, ICAR-DPR presided over the function and highlighted the contribution of ICAR-DPR for development of poultry sector in the country through its germplasm, technologies and extension activities. He also narrated the future thrust areas for which the Institute has prepared the road map to attain the target of doubling farmers' income by 2022. Earlier, Dr. S. V. Rama Rao, Principal Scientist presented the research activities of the Institute. Dr. M. R. Reddy, Principal Scientist and Chairman organizing committee welcomed the dignitaries.



Director's Column

I am glad to present the Newsletter of ICAR-DPR for the period January to June 2020. Analysis of the selection data for the synthetic coloured broiler female line using animal model has indicated positive genetic gain in five-week body weight and forty weeks egg production. Marker assisted selection has been used in the control broiler line that was further used for the development of a promising dual-purpose cross. The advanced technique RNAi was employed for the development of low serum cholesterol chicken, wherein a 36.5% reduction in serum cholesterol was achieved. Marek's disease virus (MD) and Reticuloendotheliosis virus (REV) from tumor tissue samples can now be simultaneously detected with a duplex PCR assay. TAP1, TAP2 and Tapasin genes were genotyped and their association with immunocompetence traits in chicken was studied. This will help in the genetic selection of birds with desirable immunocompetent traits. Selenium supplementation in chicken has shown

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beneficial effects on production traits. Procedure for production of poultry litter compost and vermicompost has been standardized. Based on the integrated farming concept, an experimental facility for rearing chicken under semi-intensive system in Moringa plantation has been developed at the Directorate.

The Directorate celebrated its 33rd Foundation Day, where Dr. B.N. Tripathi, Deputy Director General (Animal Science) was the Chief Guest. Renewable energy source is being generated and utilized with the installation of 50KW rooftop solar panels. A training programme sponsored by Agriculture Skill Council of India was organized in which 20 participants were trained for a month. Farmers were trained under Scheduled Caste Sub Plan (SCSP) and Tribal Sub Plan (TSP), and were subsequently provided with grownup birds and other necessary equipment. During this period, a total of 5,82,155 improved germplasm were supplied from the Institute and various centres of AICRP on Poultry Breeding and Poultry Seed Project. Despite the COVID-19 pandemic and the associated constraints, the Directorate endeavored to serve the nation with all due precautions following the Government guidelines.


(R.N.Chatterjee)
Director

RESEARCH HIGHLIGHTS

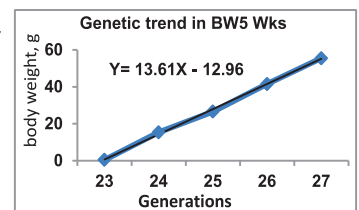
Genetic gain in Synthetic coloured broiler female (PB-2) line

The data of 19,890 synthetic coloured broiler female line (PB-2) chicks hatched during S-23 to S-27 generations were utilized to estimate variance components and genetic parameters for growth and production traits using REML animal model. The overall least squares mean (LSM) for body weights at 0 day (BW0), 2 wks (BW2), 4 wks (BW4), and five wks (BW5), shank length at 5 wks (SL5) and breast angle at 5 wks (BA5) of age were 40.0g, 207.4g, 589.6g, 828.5g, 76.9mm and 80.8°, respectively. The overall LSM for egg production up to 40 wks of age (EP40) and egg weight at 40 wks (EW40) were 66.0 eggs and 58.2g, respectively.

The heritability estimates using the best model for BW0, BW2, BW4, BW5, SL5 and BA5 were 0.06±0.03, 0.19±0.03, 0.15±0.03, 0.14±0.02, 0.08±0.02 and 0.02±0.01, respectively. Model 4 with additive, maternal permanent environmental, residual and phenotypic effects was the best model for early growth traits except BW0 and BA5. For BW0, model 5 was the best in which maternal genetic component was included in addition to the model 4. Model 1 with only additive genetic component was the best for the trait BA5. The heritability estimates were low to moderate in the magnitude for all the early growth traits. Inclusion of a maternal genetic effect in the models noticeably improved goodness of fit for all the juvenile traits. The heritability for egg production up to 40 wks (EP40) was 0.30±0.05. The heritability estimates for adult body weights at 20 and 40 wks of age (BW 20 and BW 40), age at sexual maturity (ASM) and egg weight at 40 wks (EW40) were 0.21±0.04, 0.19±0.04, 0.16±0.03 and 0.33±0.05, respectively and the estimates were moderate to high in magnitude. Model 1 with direct additive effects was the best model for all the production traits viz. ASM, BW20, BW40, EP40 and EW40.

The breeding value of BW5 increased linearly from 0.044 to 55.48g in a linear direction indicating the effectiveness of selection. Similar trend was observed in BW2, BW4 and SL5 as correlated responses as shank length and body

weight are highly correlated traits. The breeding value of ASM gradually reduced over the generations, which was in desired direction. The breeding value of egg production at 40 wks of age increased linearly. The

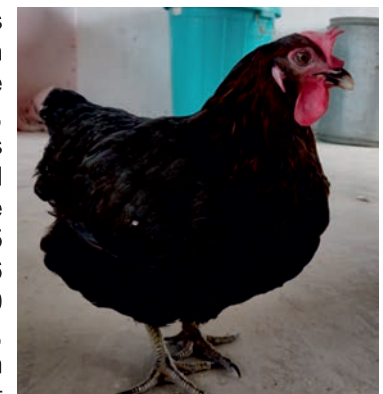


genetic trend showed that the selection was operating in positive direction in both BW5 and EP40, the primary traits under selection. The animal model minimized the over-estimation of genetic parameters and improved the accuracy of the BV, thus enabling the breeder to select the suitable breeding strategy for genetic improvement.

(L.L.L. Prince *et al.*)

Development of a dual-purpose cross by crossing control broiler improved through MAS and PD-4

A dual purpose cross of chicken was developed by crossing improved control broiler birds selected through marker assisted selection (MAS) for 4 generations with PD-4 (Improved Aseel) birds. The feathers of the birds were mostly black with brown and barred. The body weight of birds at 8, 10 and 12 wks of age was 1002.5, 1389.2 and 1646.9g, respectively. The age at first lay was 137.5 days. The hens laid 99.6 and 154.6 eggs upto 40 and 52 wks of age, respectively under the farm condition. The egg weight at 40 wks of age was 53.5g. The shell colour of the egg was light brown. This cross may be used as promising dual-purpose chicken cross suitable for backyard and intensive/semi-intensive poultry farming.



Adult hen of the dual purpose chicken cross

(T.K. Bhattacharya *et al.*)

Development of low-serum cholesterol chicken through RNAi

The reduction of cholesterol content in poultry egg has been one of the major goals for production of value added poultry produce. In this regard, a knock down chicken was developed through RNAi by silencing two important genes namely, Acetyl Co-A carboxylase alpha (*ACACA*) and



Knock down bird developed through RNAi



Knock down chicks produced from the knock down parents

sterol regulatory element binding protein 1 (*SREBP-1*), which are involved in de novo lipid biosynthesis. The *ACACA* and *SREBP-1* knock down birds showed 21.2 and 19.1% reduction in serum cholesterol content at 6 wks of age, respectively over the control birds. In case of *ACACA* knock down, 13.3% reduction of serum triglycerides was observed in knock down birds as compared to the control birds (88.4mg/dL) whereas, in case of *SREBP-1* knock down, 36.5% reduction in serum cholesterol content was found in knock down birds. Thus the knock down birds of *ACACA* and *SREBP-1* genes showed significantly ($P<0.05$) lower serum cholesterol content over the control birds.

(T.K. Bhattacharya *et al.*)

Development and validation of duplex PCR assay

A duplex PCR assay for simultaneous detection of Marek's disease virus (MD) and Reticuloendotheliosis virus (REV) from tumor tissue samples was optimized with custom designed primers and protocols. Primers against pp38 and LTR genes were targeted for conserved region against MD and REV, respectively. Primers were synthesized and PCR amplification protocols were standardized. The duplex PCR yielded 206 bp and 128 bp amplicons for MD and REV, respectively.

(T.R. Kannaki *et al.*)

Genotyping TAP1, TAP2 and Tapasin genes for their association with immunocompetence traits in chicken

Unique SNPs identification, haplotypes/ haplogroups information and their association with the immunocompetence traits was carried out for transporters associated with antigen processing (*TAP1*, *TAP2*) and Tapasin genes in chicken breeds viz. Brown Nicobari, Ghagus and Dahlem Red. The study revealed that the Cytotoxic T cell count, HA titer and serum Creatinine levels significantly varied between Tapasin gene haplogroups. The Tapasin gene in Brown Nicobari haplogroup h1h3 had significantly higher Cytotoxic T cell (3.91 ± 0.03 $10^3/\mu\text{L}$) and hemagglutination inhibition titer (9.94 ± 0.25 log₂) as compared to other two haplogroups (h1h2 and h1h4). In

Brown Nicobari, *TAP1* gene haplogroup h1h2 had significantly higher hemagglutination inhibition titer (10.12 ± 0.40 log₂) against ND vaccine. Ghagus *TAP2* gene haplogroup h1h3 had significantly lower serum cholesterol level (115.56 ± 11.8 mg/dL). The findings will be helpful for genetic selection of birds with desired immunocompetence traits.

(S.P. Yadav *et al.*)

Effect of dietary selenium supplementation on performance and hormonal profile in Vanaraja and Aseel breeder hens

A total of 50 each of 24-wks old Vanaraja and Aseel chickens were randomly divided into two equal groups of twenty five birds each with 5 replicates of 5 birds each. The birds in one group were fed the standard layer diet (control), while the other group was fed the standard layer diet supplemented with yeast enriched Selenium (Se) (0.15g/kg feed for Vanaraja and 0.09g/kg feed for Aseel) from 24 to 36 wks of age. The birds in all the groups were fed 110g of feed/bird/day.

Supplementation of Se to Vanaraja birds increased body weight significantly ($P<0.05$) from 28-32 wks of age, whereas such an effect was not recorded in Aseel birds. The egg production increased with Se in Aseel when compared to the control group (34 vs 37.5%). The concentration of plasma melatonin did not differ significantly between control and Se groups at 28 wks of age, but supplementation of Se increased the mean concentration of melatonin in Vanaraja (299 vs 352pg/ml) and Aseel (188 vs 227pg/ml) at 36 wks of age. The ghrelin hormone concentration was not affected in Vanaraja at any time of the laying phase. In Aseel, the concentration of ghrelin decreased in the earlier phase, but increased (13.6 vs 28.4pg/ml) during 32-36 wks of age. It was observed that in both the breeds, the concentration of progesterone hormone was lower in the Se supplemented group during 24-28 wks of age, but Se supplementation increased its concentration during 32-36 wks of age (1.7 vs 2.07ng/ml in Vanaraja and 2.4 vs 3.4ng/ml in Aseel). In both the breeds, the concentration of estradiol hormone was lower in the Se supplemented group during 24-28 wks of age, but Se increased the concentration during 32-36 wks of age (54 vs 96pg/ml in Vanaraja and 89 vs 130pg/ml in Aseel).

(N. Anand Laxmi *et al.*)

Poultry litter compost and vermicompost preparation by mixing dry leaves (Wealth from Waste)

i) Compost preparation with C/N ratio of 35:1

The compost preparation started with C/N ratio of 35:1 by mixing poultry litter with dry leaves having relative humidity 48%, pH 5.2 and temperature 36.2°C. 13 kg of litter was mixed with 46 kg of dry leaves. The humidity was maintained at around



Compost with C/N ratio of 35:1

50%. The temperature kept changing due to the growth of the microbes inside the pile. The compost was ready on 57th day. The relative humidity was 50%, pH was 5.0 and temperature was 30.2°C on 57th day.

ii) Compost preparation with C/N ratio of 25:1

The compost preparation started with C/N ratio of 25:1 by mixing litter with dry leaves as supplement having relative humidity 47%, pH 5.3 and temperature was 36°C. Forty kilogram of litter was taken and mixed with 40 kg of dry leaves. The final product, compost, was ready on 57th day. The relative humidity was 50%, pH was 5.0 and temperature was 30.2°C on the final day.



Compost with C/N ratio of 25:1

Vermicompost preparation with poultry litter and dry leaves

Vermicompost was prepared with the two compost samples having 35:1 and 25:1 C/N ratios.

i) Vermicompost having C/N ratio of 35:1

Vermicompost was prepared with the poultry litter compost. As the poultry litter is having nitrogen toxicity where the earthworms will not survive and the nitrogen toxicity was neutralized first by making compost. After making compost, the same was subjected to form the Vermicompost by introducing earthworms which multiplied and converted the waste into useful product. The Vermicompost was ready within 80 days and at the end good number of earthworms were left behind.



Vermicompost with C/N ratio of 35:1

ii) Vermicompost having C/N ratio of 25:1

In this group, the nitrogen toxicity of the poultry litter was first neutralized by making 25:1 C/N ratio compost and afterwards, the same was subjected to form the Vermicompost. Earthworms were introduced and the Vermicompost was ready within 80 days.



Vermicompost with C/N ratio of 25:1

Moringa leaves as feed supplement for backyard poultry in an integrated farming concept

A total of 600 birds of Gramapriya and cross of White Leghorn and Kadaknath were housed in night shelter having an area of 1245 sft, which was constructed within the Moringa plantation. The birds were raised on dried



Poultry rearing in Moringa plantation

Moringa leaf powder and poultry feed (70g) as well as supplements like earthworms and kitchen wastes. The average body weight of Gramapriya birds at the age of 20 wks was 1361g, which has increased to 1515g by 24 wks. The egg production at 24 and 26 wks of age was 42% and 53%, respectively.

(R.K. Mahapatra et al.)

EVENTS ORGANISED

ICAR-DPR celebrates National Science Day

The Directorate organized the National Science Day celebrations on 28th February 2020. Dr. G.R. Yugandhar, MS (General Surgery), Swamy Hospital and founder president of 'The World United' organization graced as the Chief Guest. Dr. SV Rama Rao, Director I/c thanked the Chief Guest for giving the staff a detailed demonstration on



Dr. G.R. Yugandhar delivering the talk



School children at the exhibition

the mind control process to reduce stress. An exhibition to showcase the new technologies and varieties developed by the institute and information on chicken and eggs was also organized, where about 500 school children from different Schools visited the stall.

Hindi implementation activities

During the period, the Official Language Cell conducted quarterly meeting for March & June quarters on 27-06-2020, in which several issues were discussed for the effective implementation of Hindi in daily official usage.

Republic Day

The Directorate celebrated the Republic Day on 26th January 2020. Dr. R.N. Chatterjee, Director hoisted the National Flag and addressed the staff of the institute and their families.

Rooftop solar system installation

In relation to utilization of renewable solar energy at the institute, Grid-connected 50kW Rooftop Solar panels were installed on the terrace of the Admin-Lab building and commissioned.



TRANSFER OF TECHNOLOGY

Tribal Sub Plan

The Directorate introduced rural/ backyard chicken farming with improved varieties and native chicken, with an aim to improve the economic and living standards of tribal farmers under the Scheduled Tribe Component (formerly Tribal Sub Plan) Program. A mother unit facility was established at ITDA, Utnoor, Telangana to grow the chicks during nursery phase. During this period, a total of 2520 Vanaraja day-old chicks and 5000 kg chick feed was provided to the mother unit for rearing up to six wks of age. Grownup birds were distributed by ITDA to the tribal farmers of Adilabad district, Telangana. A total of 150 night shelters to protect the birds under backyard conditions were purchased to benefit 150 tribal farmers and their distribution was pending due to the COVID-19 situation.

SC Sub Plan

Five input distribution plans were organized in three different states (Telangana, Bihar and Madhya Pradesh) under the SC Sub Plan during the period to start "Backyard Poultry Farming" to improve livelihoods and nutritional security of SC families. A total of 1800 chicks, 1800 kg feed, 151 night shelters, 90 feeders, 90 drinkers, 90 training kits, pamphlets on backyard chicken and 90 packets of medicines and vitamins were distributed to 241 SC beneficiaries in Telangana to start backyard poultry farming. The input activities were stopped from March 2nd wk onwards as per the Govt. of India guidelines for covid-19 control.

Training cum Input distribution programme in Bihar under SC Sub-plan

The Directorate in collaboration with the Patna centre (Bihar Animal Science University) of Poultry Seed Project organized Training cum input distribution programme on "Backyard Poultry Farming" and distributed inputs to 60 SC beneficiaries to start backyard poultry farming at Chhatana village in Patna district of Bihar under the Scheduled Caste Sub Plan on 11-02-2020. A total of 60 SC farmers, mostly women from four villages (Chhatana, Mangalichak, Mahuli and Suitha) were benefitted. These beneficiaries undergone one day off-campus training on "Backyard Poultry Rearing" at Chhatana conducted by Dr. S. K. Bhanja, Dr. Vijay Kumar and Dr. Pankaj Kumar.



Dr. R. N. Chatterjee distributing chicks



Woman beneficiaries

Each beneficiary was provided with 20 chicks, 20kg feed, one feeder, one waterer and a training kit. Dr. R. N. Chatterjee, Director, ICAR-DPR, Dr. Ravindra Kumar, Director (Research), BASU and Dr. J. K. Prasad, Dean, Bihar Veterinary College participated in the programme and motivated the farmers to adopt poultry farming as the supplementary source of income, source of nutrition security as well as employment. The programme was coordinated by Dr. Vijay Kumar from SC Sub Plan team of the Directorate.

AKMU

Institute webpage (<http://www.pdonpoultry.org>) was frequently updated and had about 5 lakh hits during the period Jan to Jun, 2020 with an average of 2800 visits per day. The ICAR-DPR Android Mobile App was maintained and about 588 users downloaded during the period Jan to Jun, 2020.

Input distribution to farmers SCSP Programme

Date	Beneficiaries	Inputs distributed
16-01-2020	76 Farmer families from Chinchalpet village, Vikarabad District, Telangana	76 Temporary night Shelters, Pamphlets on backyard chicken farming
11-02-2020	60 Farmer families from Chatana, Mangalichak, Mahuli and Suitha villages, Patna district Bihar	1200 chicks, 1200 kg feed, 60 feeders, 60 drinkers, 60 training bags, 60 packets of medicine and vitamins, Pamphlets on backyard chicken farming
15-02-2020	35 Farmer families from Shambunipet village, Warangal district, Telangana	35 Night Shelters, Pamphlets on backyard chicken farming
16-02-2020	30 Farmer families from Satna, Madhya Pradesh	600 chicks, 600kg feed, 30 feeders, 30 drinkers, 30 training bags, 30 packets of medicine and vitamins, Pamphlets on backyard chicken farming
19-02-2020	40 Farmer families from Thimmampet Village, Jangaon district, Telangana	40 Temporary night Shelters, Pamphlets on backyard chicken farming
Total	241 beneficiaries	

TRAININGS CONDUCTED/SKILL DEVELOPMENT

ICAR-DPR organized Training Programme sponsored by Agriculture Skill Council of India

The Directorate organized a Training Programme on "Small Poultry Farmer" during 06 January – 04 February 2020, which was sponsored by the Agriculture Skill Council of India (ASCI), Ministry of Skill Development and Entrepreneurship, Govt. of India. A total of 20 trainees from four different states of the country attended the programme. The trainees were exposed to various aspects of poultry production and the training was mostly through hands-on-experience. An exposure visit to ICAR - NRC on Meat, Hyderabad was arranged for imparting knowledge on clean meat production. Dr. R.N. Chatterjee, Director gave away the certificates to the participants.



Dr. R. N. Chatterjee distributing Certificate

Other trainings organized for poultry farmers

Sl.No.	Program	Trainees	Date
1.	On field Training on "Backyard Poultry Rearing" to Scheduled Caste farmers under SCSP	60 SC farmers from Chatana, Mangalichak, Mahuli and Suitha villages, Patna district, Bihar. Location: Chatana village in Patna district, Bihar	11 February 2020
2.	On field Training on "Backyard Poultry Rearing" to Scheduled Caste farmers under SCSP	30 SC farmers from Satna Taluk, Madhya Pradesh. Location: Krishi vigyan Kendra, Satna, Madhya Pradesh	16 February 2020

MEETINGS CONDUCTED

Research Advisory Committee Meeting

The meeting of Research Advisory Committee of the Directorate was held on 18th and 19th February 2020 under the Chairmanship of Prof. B.B. Mallick, Ex Vice Chancellor, WBUAFS, Kolkata and former Director, IVRI, Izatnagar. The meeting was attended by the RAC members, viz. Dr. B.S. Prakash, former ADG (AN&P), ICAR; Dr. Arjava Sharma, former Director, NBAGR, Karnal; Dr. J.R. Rao, former HOD, IVRI, Izatnagar; Dr. R.S. Gandhi, ADG (AP&B), ICAR; Dr. R.N. Chatterjee, Director, ICAR-DPR and Dr. M.V.L.N. Raju, Member Secretary.



Prof. B.B. Mallick chairing the RAC Meeting

Dr. R.N. Chatterjee, Director, ICAR-DPR presented an overview of research progress during the year 2019. The action taken on the previous recommendations and the research progress in different sections was reviewed in detail. The Chairman emphasised the need for integrating

research elements into the activity of germplasm propagation by way of generating authentic data at field level in a holistic manner involving all the disciplines. Accordingly, the programme in this direction was discussed and tentative roadmap was identified. The Committee expressed satisfaction about the work progress at the institute and made specific recommendations for further progress.

Annual Institute Research Committee Meeting

The Annual IRC meeting was held on 5th & 6th June & 25th July 2020 at the Directorate. The meetings were chaired by Dr. R.N. Chatterjee, Director and Dr. T.K. Bhattacharya acted as the Member Secretary. The Principal Investigators presented the achievements of their respective projects. The Chairman, IRC suggested measures for overcoming the difficulties in achieving desired targets.

Institutional Animal Ethics Committee Meeting

XXV IAEC meeting of ICAR-DPR was conducted on 20th June 2020 virtually through Google meet. CPCSEA nominees, Dr. Ramavat Ravindar Naik, Technical Officer, National Centre for Laboratory Animal Sciences (NCLAS), Dr. Uma Mahesh Yelisetti and Dr. Krishna Kumar, Biological E Ltd. attended the meeting. New protocols for animal experiments under the research projects were examined and approved.

Participation in Symposia / Conferences / Seminars / Workshops

Sl.No.	Event	Scientist	Date	Venue
1.	Workshop on 'Understanding the emergence of variant infectious bronchitis virus in chickens in UK and India: shared control strategies'	Dr. T.R.Kannaki, Sr. Scientist	6-7 February, 2020	Namakkal, Tamilnadu
2.	National Symposium on Enhancement of farmers' income through management of animal genetic resources and XVII annual convention of society of conservation of domestic animal biodiversity (SOCDAB)	Dr. Santosh Haunshi, Pr. Scientist Dr. L.L.L.Prince, Pr. Scientist	10-11 February, 2020	College of Veterinary and Animal Husbandry, Mhow, MP

AWARDS / RECOGNITIONS

Dr. N. Anand Laxmi, Principal Scientist received the Reviewer Excellence Award from Indian Journal of Animal Research

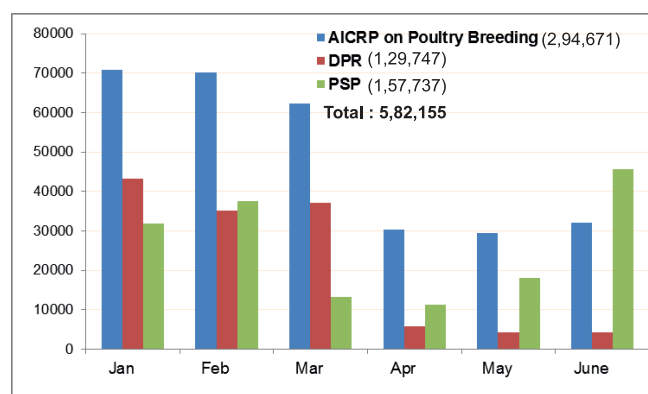
PERSONALIA

Promotion: Mr. R. Sudarshan, JAO has been promoted as AFAO w.e.f. 1st May 2020

Retirement: Mr. C. Bagaiah, AFAO has retired on superannuation on 30th April 2020

Obituary: Dr. Chandan Paswan, Senior Scientist has passed away on 20th April 2020

Germplasm Supply during January - June 2020



DISTINGUISHED VISITORS

- Dr. B.N. Tripathi DDG (Animal Science), ICAR, New Delhi
- Prof. B.B. Mallick, Chairman, RAC & Former VC, WBUAFS, Kolkata
- Dr. R.S. Gandhi, ADG (AP&B), ICAR, New Delhi
- Dr. B.S. Prakash, Former ADG & Member, RAC
- Dr. Arjava Sharma, Former Director, NBAGR, Karnal & Member, RAC
- Dr. J.R. Rao, Former HOD, IVRI, Izatnagar & Member, RAC
- Dr. Sudhakar Reddy, Former Registrar, SVVU, Tirupati
- Shri Rajendra Pawar, Chairman, Agricultural Development Trust (ADT), Baramati



Glimpses of the visit of Dr. B.N. Tripathi to the Directorate

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To



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