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1. **Passport Size Photo:**

2. **Name** : Dr Chetna Gangwar

3. **Institution Address& Designation (Present)**

Scientist APR Division, Central Institute For Research On Goats, Makhdoom, po – Farah, Mathura (U.P)

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5. **Contact Number:** 09412125800

6. **Degree:** M.V.Sc and Ph.D.

7. **Experience:** As veterinary officer --- 5 year
As scientist -- 7.5 year

8. **Awards:**

- **University Scholarship** 2002-2006 for 1st position in B.V.Sc & A.H
- **Winner of 'Brucella & mastitis** diagnosis 2003-04 held at G.B.P.U.A & T. Pantnagar
- **1st runner up in pathological disease diagnosis** 2002-03 held at G.B.P.U.A & T. Pantnagar
- **2nd position in pathological disease diagnosis** 2003-04 held at G.B.P.U.A & T. Pantnagar
- **Intas Neomac Shiksha Award- '2006' For Best Graduate Student**
- **Best paper Award** in "26th Annual Convention of IAVA and National Symposium at DUVASU Mathura, 2-4 Nov 2011.
- **Young Scientist Award** in XXX annual convention of Indian Society for study of Animal reproduction (ISSAR) and national Symposium on Research and innovation to improve Animal Fertility and Fecundity 20-22 November 2014.
- **Rapporteur** in 2nd Annual meeting of society of veterinary science and Biotechnology and National Seminar on "Biotechnological approaches to challenges in animal health and production" (06-07 March,2014)
- **Rapporteur** in XXX annual convention of ISSAR in National Symposium on Research and innovation to improve Animal Fertility and Fecundity 20-22 November 2014.
- **Co-chairman** in the Asian Regional Conference on Goats 22-26 October 2018 held at Amity University Jaipur, Rajasthan
- **1st prize** in CIRG in Hindi Sodh Patra --- 2013
- **1st prize** in CIRG in Hindi Sodh Patra --- 2014
- **1st prize** in CIRG in Hindi Shabd Anuprayog Pratiyogita --- 2014
- **1st prize** in CIRG in Hindi Ritulekh Pratiyogita --- 2014
- **Appreciation award** by NAIP -- 2014
- **1st prize in Kisan mela in Scientific Knowledge Discrimination** held on 14-15 March 2014 at U.P. Pt. Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalya evan Go- anusandhan sansthan.
- **Best Hindi article award** published in **Pashudhan Prakash published by ICAR- National Bureau of Animal Genetic Resources (NBAGR) 2016**
- **Excellent reviewer award (2017)- International Journal of livestock Research.**
- **2nd prize** in CIRG in Hindi Sodh Patra Pratiyogita --- 2017

- **1st prize** in CIRG in Hindi Anuvad Pratiyogita --- 2017
- **1st prize** in CIRG in Hindi Ritulekh Pratiyogita --- 2017
- **3rd prize** in CIRG in Hindi Nibandh Pratiyogita --- 2017
- **Best oral presentation Award III** in the Asian Regional Conference on Goats 22-26 October 2018 held at Amity University Jaipur, Rajasthan.
- **Member of technical committee** in the Asian Regional Conference on Goats 22-26 October 2018 held at Amity University Jaipur, Rajasthan.
- **Best oral presentation Award** in the ISSGPU Conference on Sheep and Goats from 14-16 Feb 2019 held at Bihar Animal Sciences University, Patna, Bihar.
- **Best oral presentation Award** in the VIPM Conference on National Symposium on Sustainable Improvement in animal Health and Production-Bridging science and policy for economic Upliftment of Farmers held on 8-9 Nov, 2019 at DUVASU, Mathura.
- **Best oral presentation Award** in the National Symposium and XIV Biennial Conference of Association of Public health Veterinarians (APHV) held on 24-25 Jan, 2020 at DUVASU, Mathura.

9. Publication List:

Number of Research papers Published		Numbers of Students Guided/co guide	Project handles as P.I/CO-PI
Research paper-	41	Guide–Two (BSc, Biotechnology)	05
Invited lectures/ Chapters	45	One(M.Sc, Biotechnology)	
Books/manual	04		
Lead papers	11		
Semi technical papers	23		
Abstracts	26		
Radio talk	02		
T.V. Talk	01		

Research Paper

1. S.P.Singh, I.Singh, G.K. Singh and **Chetna Gangwar** (2008) Light Microscopic Changes in bursa of fabricus of developing Guinea fowl. Journal of Immunology and Immunopathology 10(2); 105-106.
2. **Chetna Gangwar**, Shiv Prasad, S.K.Rastogi and J.L.Singh (2009) Effect of L-NAME on luteolysis and estradiol concentration in cyclic Murrha Buffaloes. Indian Journal of Animal Physiology 1(4)27-30.
3. **Chetna Gangwar** , Shiv Prasad, J.K.Prasad, S.P.Singh & A.K.Verma (2010) Effect of Nitric oxide synthase inhibitor on progesterone secretions, NO concentration and estrous cycle length in Buffaloes. On Line Journal of Veterinary Research 14(1) 49-55.
4. S.P.Singh, I.Singh, G.K. Singh and **Chetna Gangwar** and Prabhakar Kumar (2011) Postnatal development of bursa of fabricus in relation to humoral immunity in keets.13 (1). Journal of Immunology and Immunopathology13 (1).42-45
5. S.P.Singh, I. Singh, G.K. Singh and **Chetna Gangwar** (2011) Age related change in hematological parameters of developing keets. Journal of Immunology and Immunopathology 13(1)46-49.

6. S.P.Singh, I.Singh, G.K. Singh, **Chetna Gangwar** and Prabhakar Kumar (2011) Evaluation of immune Responses of T-Cells in Guinea fowl Journal of Immunology and Immunopathology 13(1) 38-41.
7. **Chetna Gangwar** Atul Saxena and S.P.Singh (2012) Multiple congenital malformations in a female calf. Haryana Veterinarian 51(2)127-128.
8. **Chetna gangwar**, R.Ranjan Satish Kumar, S.D. Karche, A.K.Goel, N.Ramachandran, and S.K.Jindal (2014). Use of chelating agent for optimum post thaw quality of buck Semen. Indian Journal of Animal Sciences 84 (8): 839-841.
9. R.Ranjan, A.K.Goel, S.D. Karche, N.Ramachandran, **Chetna Gangwar** and S.K.Jindal (2014). Comparison of normal and dual staining technique for evaluating viability and acrosomal status in frozen thawed buck spermatozoa. Indian journal of small ruminants 20(2) : 50-53.
10. **Chetna Gangwar**, Ravindra Kumar, S P Singh, Shanker K Singh, M K Srivastava and Atul Saxena (2015). Serum metabolites and macro mineral profile of prepartum buffaloes affected with cervico-vaginal prolapse. Indian Journal of Animal Sciences 85(6): 575-577.
11. **Chetna Gangwar**, Alok Kumar and Atul Saxena (2014). Post-partum uterine prolapse in a Murrah buffalo- a case report. Polivet Intas, vol (15):57-58.
12. **Chetna Gangwar**, Ashok Kumar, Alok Kumar and Atul Saxena (2014). Post-Partum uterine prolapse in a Murrah buffalo- a case report. Buffalo Bulletin 33(2) 146-148.
13. **Chetna Gangwar**, S.D.Kharche, Ravi Ranjan, Satish Kumar, A.K. Goel and S.K. Jindal (2015). Effect of vitamin C supplementation on freezability of Barbari buck semen. Small Ruminant Research (129) 104-107.
14. K. S. Sikarwar, N. Ramachandran, Ravi Ranjan, **Chetna Gangwar** and Jitendra Kumar Agrawal (2015). Effect of Different Levels of Glycerol and DMSO on Freezability of Buck Semen. Livestock Research International 3(3) 71-73.
15. A.K.S Sikarwar, N.K. Sinha, N. Ramachandran, R Ranjan, **Chetna Gangwar** and J.K. Agrawal (2015). SDS-Page Profile of Seminal Plasma Proteins of Sirohi Buck Semen. Ruminant Sciences, 4(2) p 213-214
16. **Chetna Gangwar**, Akhil Patel, S.P.Singh and Atul Saxena.(2015) . Dystocia Due to an Anterior Duplication Twin Monster In Buffalo. Veterinary Clinical Science, 3(3) p 15-16.
17. S.D. Kharche, S.K. Jindal, A.K. Goel, Satish Kumar, **Chetna Gangwar** and Sonia Saraswat. (2015) Zona free hamster ova penetration test: fertility indicator of buck spermatozoa. The Indian Journal of Small Ruminants, 21(1): 118-121
18. **Chetna Gangwar**, S.D. Kharche, Satish Kumar and S.K. Jindal (2016). Cryopreservation of Goat Semen: Status and Prospects. Indian Journal of Small Ruminants 2016, 22(1): 1-10
19. Narendra Kumar, B. Rai, Showkat A. Bhat, S. D. Kharche, **Chetna Gangwar**, S. K. Jindal and Subhash Chandra (2016). Effect of management system and season on semen freezability in Jakhrana bucks. Veterinary World, 9(2): 199-202

- 20.S. D. Kharche, S. Agrawal, J. Pathak, A.K.S.Sikarwar, **Chetna Gangawar**, Ravi Ranjan, A.K. Goel, S.K. Jindal and S.K. Agarwal.(2016). Influence of cysteamine supplementation during in vitro culture of early stage caprine embryos on blastocyst production. *Indian Journal of Animal Sciences* 86 (3): 304–306.
- 21.Ravindra Kumar, **Chetna Gangwar**, P. Tripathi and U.B. Chaudhary. (2016) Effect of azolla supplementation on semen quality, haematology and rumen metabolites in Barbari bucks. *Indian Journal of Small Ruminants*, 22 (2): 186-189
- 22.Narendra Kumar, B Rai, **Chetna Gangwar**, Anshuman Kumar,S. D. Kharche, S. A. Lone and S. K. Jindal (2016). libido parameters and their correlation with seminal characteristics in Jakhrana bucks maintained under different systems. *Indian Journal of Animal Sciences* **86** (9): 23–28.
- 23.Narendra Kumar , B. Rai, **C. Gangwar**, G.K. Gaur , S.A. Lone and S.K. Jindal. Effect of management systems on seminal characteristics of Jakhrana Bucks. *Indian Journal of Small Ruminants* 2016, 22(2): 190-192
- 24.Vijay Kumar, S.P. Singh, M.M. Farooqui, **Chetna Gangwar**, Prabhakar Kumar and Ajay Prakash (2017) Histological Changes in Glands of Uterine Horn During Different Stages of pregnancy in goats. *Indian Journal of Small Ruminants* 2017, 23(1): 56-60.
- 25.Vijay Kumar , S. P. Singh , M. M. Farooqui, **Chetna Gangwar** , Prabhakar Kumar and Ajay Prakash (2017). Acid and Alkaline Phosphatase Activity in Uterus of Goat in Different Stage of Pregnancy. *International Journal of Livestock Research* Vol 7 (7): 92-97.
- 26.Kharche S.D., Pathak J., Sikarwar A.S., **Gangwar C.**, Priyadharsini R, Ranjan, R., Goel, A.K., Jindal S.K. and Chauhan, M.S. (2017) In vivo Transfer of Reconstructed Goat Chimeric Embryos Produced by Microinjection of Embryonic Stem Cells into Tetraploid IVF Embryos. *JSM Cell Dev Biol* 5(1): 1021.
- 27.Narendra Kumar, B. Rai , **Chetna Gangwar** , S.A. Lone, Anshuman Kumar, S.K. Gupta and Vipin Maurya. (2018). Effect of different levels of egg-yolk on freezability of Jakhrana buck semen *Indian J. Anim. Res.*, 52 (1): 20-24
- 28.Akhil Patel, Rabindra Kumar, R.K. Verma, Rajesh Kumar and **Chetna Gangwar**.(2018) Management of pre-partum recto-vaginal prolapse in a cow. *International Journal of Current Microbiology and Applied Sciences*,7 : 1244-1247.
- 29.**Chetna Gangwar**, Atul Saxena, Akhil Patel, S P Singh, Sarvajeet Yadav, Ravindra Kumar and Vijay Singh. (2018) Effect of Reduced Glutathione Supplementation on cryopreservation induced Sperm cryoinjuries in Murrah Bull semen. *Animal reproduction science*. 192 (2018) 171–178.
- 30.Pradeep Kumar, S.K.Jindal, **Chetna Gangwar***, S.D.Kharche, Juhi Pathak and Anuj Kumar Singh Sikarwar.2018. Protective effect of cholesterol loaded cyclodextrin on cryopreservation of buck spermatozoa. *Indian Journal of Animal Sciences*, 88(10): 60-63 .
- 31.Vijay Kumar, SP Singh, MM Farooqui, **Chetna Gangwar**, Prabhakar Kumar and Ajay Prakash.2018. Histo-chemical study of uterus during different stages of pregnancy in goat (*capra hircus*). *Ruminant science* 7 (1): 67-70.

32. Mohit Antil, Bhuvaneshwar Rai, Natesan Ramachandran, **Chetna Gangwar** and Arun Somagond. 2019. Hemato-biochemical and Physiological Response of Barbari Kids to Different Bedding Materials during Winter. *Int.J.Curr.Microbiol.App.Sci* 8(2): 1829-1836.
33. Mohit Antil, Bhuvaneshwar Rai, Ramachandran Natesan, **Chetna Gangwar** and Seema Yadav. 2019. Effect of Bedding Materials on Growth and FCR in Barbari Kids during Winter season. *Int.J.Curr.Microbiol.App.Sci* 8(2): 1930-1935
34. Mohit Antil, Bhuvaneshwar Rai, **Chetna Gangwar** and Dhawal Kant Yadav. 2019. Effect of bedding materials on health parameters in Barbari kids during winter season. *Journal of Entomology and Zoology Studies* 7(1): 992-996.
35. Mohit Antil, Bhuvaneshwar Rai, **Chetna Gangwar**, Ramachandran Natesan and Burhanuddin Shafi. 2019. Effect of bedding materials on morphometric parameters of barbari kids during winter season. *The Pharma Innovation Journal* 8(1): 562-564.
36. Mohit Antil, Bhuvaneshwar Rai, **Chetna Gangwar**, Ramachandran Natesan and Seema Yadav. 2019. Effect of bedding material on enzymatic and hormonal profile of Barbari kids during winters. *The Pharma Innovation Journal* 8(1): 628-630
37. **Chetna Gangwar**, Ravindra Kumar, S.D. Kharche, S.K. Jindal, U.B Chaudhary and A.K. Mishra. 2019. The effect of Azolla supplementation in feed on semen freezability in bucks. *Indian Journal of Animal Sciences*- 89(4):42-45
38. **Chetna Gangwar**, Atul Saxena , P.K. Shukla , S.P. Singh , Akhil Patel, Mohit Antil and Abhinov Verma. 2019. Cryopreservation Induced Alteration in Sperm Morphology in Haryana bull Semen. *International Journal of Livestock Research*. 9 (2): 282-288.
39. Vijay Kumar , SP Singh, MM Farooqui , **Chetna Gangwar** , Ajay Prakash and Abhinov Verma. 2019. Morphometry of Goat Uterus During Different Stages of Pregnancy. *Veterinary Research International*, 7(2): 51-55.
40. **Chetna Gangwar**, Atul Saxena, Sarvajeet Yadav, Shri Prakash Singh, Vijay Singh, Akhil Patel. 2019. Cryopreservation Induced Sperm Cryoinjuries in Haryana Bull Semen. *International Journal of Livestock Research*. 9 (6): 136-147.
41. Suresh Dinkar Kharche, Dayanidhi Jena, **Chetna Gangwar**, Amit Khatti and B Balamurugan. 2019. Role of certain growth factors and hormones in folliculogenesis. *Indian Journal of Animal Sciences*, 89(12): 1303–1308.
42. Vinay Chaturvedi, **Chetna Gangwar***, Gopal Dass, Nitika Sharma and A.K. Mishra. 2019. Successful Management of Post Parturient Uterine Prolapse in Ewe: A Case Report.. *Veterinary Clinical Science | July-September, 2019 | Volume 07 | Issue 03 | Pages 18-20.*
43. **Chetna Gangwar***, D. Jena , S.D. Kharche, N. Kumar , S.K. Jindal, R. Ranjan and A.K. Goel. Effect of sugar supplementation in diluent on buck sperm characteristics at refrigeration temperature. *Indian Journal of Small Ruminants* 2020, 26(1): 125-127.

Review Articles

- **Chetna Gangwar**, S.D. Kharche, Satish Kumar and S.K. Jindal (2016). Cryopreservation of Goat Semen: Status and Prospects. Indian Journal of Small Ruminants 2016, 22(1): 1-10
- Suresh Dinkar Kharche, Dayanidhi Jena, **Chetna Gangwar**, Amit Khatti and B Balamurugan. 2019. Role of certain growth factors and hormones in folliculogenesis. Indian Journal of Animal Sciences, 89(12): 1303–1308.

Folders:

चेतना गंगवार, एस.डी. खर्चे, विजय कुमार, ए.के. गोयल, रवि रंजन, रवीन्द्र कुमार, एन.रामाचन्द्रन, बी.राय, एस.पी. सिंह एवं एम.एस. चौहान (2019) बकरियों में कृत्रिम गर्भाधान एक उत्तम तकनीक

रवि रंजन, पल्लवी सिंह, एस.डी. खर्चे, **चेतना गंगवार** एवं एम.एस. चौहान (2019) बकरियों में कृत्रिम गर्भाधान,

N. Ramachandran, Arvind Kumar, B.Rai, S.P.Singh, S.D. Kharche, **Chetna Gangwar**, Vishal Kumar and R.K. Singh. 2019. Modern Elevated Goat Shelter with Plastic Slatted Flooring for Intensive Goat Production.

Chetna Gangwar, Vijay Kumar, Brajmohan, Vinay Chaturvedi, A.K. Dixit and S.D. Kharche. 2020. Bakriyon me Janan Sambandhi Samasyaen Evum Unka Nidan.

Lead paper:

Gangwar Chetna, Ranjan R., Kharche S.D., Kumar Satish, Jindal S.K. and Agarwal S.K. (2014) : Cryopreservation of Goat Semen : Present status and Future prospects. Sheep and Goat Biodiversity and breeding policies-Issues and perspective and Annual conference of Indian Society for sheep & Goat Production & held on Krantisinh Nana patil College of Veterinary Science, Shirwal (Satara) 21-22 February, 2014. p. 346-361.

Kharche S.D., **Gangwar Chetna** and Agarwal S.K. (2014) : Animal Cloning : Technological Development for future application. National Symposium on “Frontier Reproductive Biotechnologies for enhancing Animal fertility and fecundity global perspective and XXIX annual convention of India society for study of animal reproductive” held on MAFSU, Nagpur. p. 297-311.

Kharche S.D., **Gangwar Chetna**, Ranjan R., and Agarwal S.K. (2014): Reproductive technologies for enhancing animal production. 2nd Annual meeting of society of veterinary science and Biotechnology and national seminar on Biotechnologies approaches to challenges in animal health and production held on 6-7 March,2014 U.P. Pt. Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalya evan Go-Anusandhan Sansthan, Mathura. p. 72-79.

Ranjan R., **Gangwar Chetna**, Kharche S.D., Jindal S.K., and Agarwal S.K. (2014): Future prospects of embryonic stem cell in small ruminants. Sheep and Goat Biodiversity and breeding policies-Issues and perspective and Annual conference of Indian Society for sheep & Goat Production & held on Krantisinh Nana patil College of Veterinary Science, Shirwal (Satara) 21-22 February, 2014. p. 230-24

Kumar Satish, Ranjan R. and **Gangwar Chetna**. (2014) Advances in reduction of cryodamages to sperm cell. Sheep and Goat Biodiversity and breeding policies-Issues and perspective and Annual conference of Indian Society for sheep & Goat Production & held on Krantisinh Nana patil College of Veterinary Science, Shirwal (Satara) 21-22 February, 2014. p. 230-241.

Gangwar Chetna, Kharche S.D. and Singh S.P. (2015). Use of Herbs and Spices in Animal Production. National Seminar on "Ethnobotany : Concept and Prospectives" organized by B.S.A College Mathura from March 21-22, 2015.

S. D. Kharche, **Chetna Gangwar** and M. S. Chauhan (2017). Applications of assisted reproductive techniques in changing climatic scenario. Workshop on Commercial and Backyard goat farming with scientific approach by Rajasthan Science Congress held at Amity University Jaipur, 13-14 october, 2017. p. 4.

Jindal S.K., Goel A.K., Kharche S. D., Ranjan R., **Gangwar Chetna** and Chauhan M. S. (2017). Application of assisted reproductive technologies for quality goat production. National seminar on small ruminants: National scope on up-scaling production to products value addition and their safety held at CIRG, Makhdoom, Farah, Mathura on 9-10 November,2017.p.50-52.

Ranjan R., **Gangwar Chetna**, Kharche S.D. and Chauhan M.S. 2018. Artificial Insemination improves livelihood security to goat farmer and fast multiplication of superior germplasm. In international conference on rural livelihood improvement for enhancing farmer's income through sustainable innovative agri and allied enterprises at Birla institute of technology, Patna, Bihar on 31 Oct-1Nov,2018.p.83-88.

Kharche S.D., Ranjan R., **Gangwar Chetna** and S.P.Singh. 2018. Parthenogenes: An Innovative Assisted Reproductive Technique for Production of Female goat. In Asian Regional Conference on Goats at Jaipur, Rajasthan on 22-27 Oct .2018.p. 41-42.

Jindal S.K., **Gangwar Chetna** and Sonia Saraswat. 2018. Semen cryopreservation and Artificial Insemination in Goats In XXVII Annual Conference of Society of Animal Physiologists of India & National Symposium On "Augmentation of Animal Productivity under Changing Socio-Economic Scenario" on 27-28, November.2018 .p 125-130.

Books/Manual

1. Souvik Paul, Mahesh Dige, Chetna Gangwar and M.S.Chauhan (2017). Edited or compiled training manual on "Scientific Goat Farming" sponsored by Chief District Veterinary Officer, Kendrapada (Odissa) under National Livestock Mission, 2015-2016, held from 6-9 september, 2017 at ICAR-CIRG, Mathura.
2. Ravi Ranjan, Chetna Gangwar, S. P. Singh and M.S. Chauhan (2018) Edited or compiled Hands on training manual on "Semen freezing and artificial insemination in goats" sponsored by ICAR-CIRG Makhdoom, Farah, Mathura (UP) on 10-16 April, 2018.
3. Ravi Ranjan, Chetna Gangwar and M.S. Chauhan (2018) Edited or compiled Hands on training manual on "Semen freezing and artificial insemination in goats" sponsored by ICAR-CIRG Makhdoom, Farah, Mathura (UP) on 14-21 Sept, 2018.
4. Ravi Ranjan, Chetna Gangwar and M.S. Chauhan (2019). Artificial Insemination : An Emerging Technique in Goat Production. ICAR-Central Institute for Research on Goats, Makhdoom, Mathura, ISBN No. 978-93-5351-283-5, pp 125.

5. S.D. Kharche, S.P.Singh, Chetna Gangwar and M.S. Chauhan. 2019. Stem cells for enhancing production and reproduction. ICAR-CIRG Publication, pp1-120.ISBN no. 978-93-5391-639-629-9

Lectures / Chapters

1. M. S. Dige, M. K. Singh, P. K. Rout, **Chetna Gangwar** and S. K. Singh (2014). Importance of Record keeping in farm animals. In: Model Training Course on “Sustainable Development through Improved Goat Husbandry Practices” November 14-21, 2014: Published by CIRG, Makhdoom. Pg 97-106.
2. V. Sachan, A. Patel and **Chetna Gangwar** (2016). Headways in method of oestrous detection in bovine. In: Trainer’s training manual on “ Artificial insemination in bovine & reproductive health management in dairy animalas. DUVASU, Mathura pg 12-16.
3. Ravi Ranjan and **Chetna Gangwar** (2017). Artificial insemination in Goats. In: paravets training manual on “Scientific Goat Farming” sponsored by Chief District Veterinary Officer, Kendrapada (Odissa) under National Livestock Mission, held from 6-9 september, 2017 at ICAR-CIRG, Mathura 69-72.
4. **Chetna Gangwar**, Ravi Ranjan and S.D. Kharche (2017). Cryopreservation of Spermatogonial stem cells. In: National Training Manual on “ Spermatogonial stem cell biology” sponsored by Department of Biotechnology (Govt. of India) under the twinning programme for North east region held at CIRG, Makhdoom, Farah, Mathura (UP) on Nov13-22, 2017,pg 41-49.
5. S.D. Kharche, S.P. Singh, Ravi Ranjan and **Chetna Gangwar** (2017). Stem cells and their applications as biotechnological tool for reproductive management of farm animals. In: National Training Manual on “ Spermatogonial stem cell biology” sponsored by Department of Biotechnology (Govt. of India) under the twinning programme for North east region held at CIRG, Makhdoom, Farah, Mathura (UP) on Nov13-22, 2017,pg 4-10.
6. Ravi Ranjan, **Chetna Gangwar**, S.D. Kharche and S.P. Singh (2017). Factors influencing isolation and invitro culture of spermatogonial stem cells. In: National Training Manual on “ Spermatogonial stem cell biology” sponsored by Department of Biotechnology (Govt. of India) under the twinning programme for North east region held at CIRG, Makhdoom, Farah, Mathura (UP) on Nov13-22, 2017,pg 36-40.
7. S D Kharche, **Chetna Gangwar**, and A K Goel. 2018. How to Improve Reproductive Efficiency in Goats. In: Compendium on “ Advances on Goat Production and Health Management” Anu Rahal, M S Dige, M S Chauhan (eds.) ICAR CIRG Makhdoom Publication, pp.71-89.
8. S.K.Jindal, Ravi Ranjan and **Chetna Gangwar**(2018). Cryopreservation of semen. In Hands on Training Manual on “Semen freezing and artificial insemination in goats” sponsored by ICAR-CIRG Makhdoom, Farah, Mathura (UP) on 10-16 April, 2018,pg 6-12.
9. **Chetna Gangwar** (2018). Diluents and dilution rate of buck semen for cryopreservation. In Hands on Training Manual on “Semen freezing and artificial insemination in goats” sponsored by ICAR-CIRG Makhdoom, Farah, Mathura (UP) on 10-16 April, 2018,pg 19-22.
10. **Chetna Gangwar** (2018). Evaluation of buck semen. In Hands on Training Manual on “Semen freezing and artificial insemination in goats” sponsored by ICAR-CIRG Makhdoom, Farah, Mathura (UP) on 10-16 April, 2018,pg 28-32.
11. Kharche SD, Gangwar Chetna, **Goel AK**, Jindal SK and Chauhan MS. 2018. Augmentation of Reproduction in Goats. In: Manual on “Advances on Goat Production and Health Management” SD Kharche, SP Singh , MS Chauhan (eds.) ICAR CIRG Makhdoom Publication, pp. 45-53.
12. S.D. Kharche, **Chetna Gangwar**, Ravi Ranjan, S.P. Singh and Dayanidhi Jena. (2018). Quality control measures in artificial insemination programme. In Hands on Training Manual on

- “Semen freezing and artificial insemination in goats” sponsored by ICAR-CIRG Makhdoom, Farah, Mathura (UP) on 10-16 April, 2018,pg 41-46.
13. S.D. Kharche, Dayanidhi Jena, **Chetna Gangwar** and A.K. Goel (2018). Oestrus synchronisation and its application in goats. In Hands on Training Manual on “Semen freezing and artificial insemination in goats” sponsored by ICAR-CIRG Makhdoom, Farah, Mathura (UP) on 10-16 April, 2018,pg 61-67.
 14. **Chetna Gangwar**, Ravi Ranjan and S.D. Kharche (2018). Selection of breeding bucks and their management. In Veterinary officers training Manual on “Advances in goat production and health management” sponsored by Rajasthan on 18-24 April, 2018, pg 23-26.
 15. Ravi Ranjan and **Chetna Gangwar** (2018). Semen collection, evaluation and its cryopreservation. In Veterinary officers training Manual on “Advances in goat production and health management” sponsored by Rajasthan on 18-24 April, 2018, pg 27-30.
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