

Recipient of the IETS Lifetime Achievement Award: Dr Richard Fayer-Hosken, BVSc, PhD

Dr Richard Arthur Fayer-Hosken was born 26 January, 1954 in Gwelo, Southern Rhodesia (now Zimbabwe), Africa. He knew from an early age he wanted to follow in his father's footsteps and become a veterinarian.

Dr Fayer-Hosken received his BSc. In Zoology and Entomology from Rhodes University in 1975 and his veterinary degree from University of Pretoria in 1981, both in South Africa. For the next three years he worked in mixed veterinary practices in Zimbabwe (then Rhodesia) and the USA before entering graduate school. His PhD from the University of Georgia was granted in 1987 for research on the 'Influence of cholesterol sulfate and carbohydrate moieties on rabbit sperm penetration of zonae pellucidae'. Other areas of research included the molecular basis of sperm-egg interaction and bovine *in vitro* fertilization with laparoscopically recovered follicular oocytes. After receiving his doctorate he served as an assistant researcher in physiology and pharmacology at UGA's College of Veterinary Medicine and joined the faculty as an assistant professor of Theriogenology in 1988. He was promoted to Associate Professor in 1993, granted tenure in 1994, and added a joint appointment in the Department of Physiology and Large Animal Medicine in 1999. Richard was active in teaching and research at UGA until he retired in 2012. During his long academic career he was honoured with a Lilly teaching fellowship and numerous faculty awards for teaching excellence in animal reproduction with special emphasis on horses.

In his quest to enhance learning and improve teaching techniques, Richard programmed and produced the Theriogenology Autotutorial System (Tas.). This series of instructional and interactive videos allowed veterinary students to independently learn semen evaluation in the bull, stallion, ram and dog, laparoscopic oocyte recovery in cows and reproductive endocrinology in several domestic species. The entire teaching system was placed on the UGA server and made available on the internet.

Richard shared his technical and research expertise with scores of veterinary and graduate students in the United States and South Africa. Richard was best known professionally for the development of a contraceptive vaccine to control populations of dogs, cats and elephants. His elephant immunocontraception work won a Creative Research award from UGA and a National Phi Zeta award for research excellence. In addition to veterinary physiology, biochemistry of reproduction, equine and small animal theriogenology, and wildlife veterinary medicine and immobilisation, his resident instruction lectures included current technologies in elephant and rhinoceros physiology. In later years his research focus, as well as his passion, was the monitoring and protection of elephants in Kruger National Park in South Africa. He enhanced animal care in that country by



conducting veterinary medicine and immobilisation clinical rotations for veterinary students.

From the time he joined the faculty at University of Georgia until the year he retired, Richard actively pursued and received grant funding for his research. The majority of his grants supported the development of injectable sterilant vaccines for dogs and cats. This work led to grants from agencies such as The Nature Conservancy of Hawaii, the National Park Service, the Bureau of Land Management, and the Humane Society of the United States to implement immunocontraception in feral pigs, free-roaming African elephants, feral horses and white-tailed deer.

During his tenure at University of Georgia, Richard was active in developing the next generations of reproductive physiologists. He mentored 13 Master's students and shepherded 7 students through their PhD programs. Most of his students earned their advanced degrees from UGA studying equine semen cryopreservation and oocyte maturation, sperm capacitation, *in vitro* fertilization, cloning in dogs, and immunocontraception. He was drawn back to Africa to guide a doctoral student in exploring novel techniques to measure stress in wild-caught white rhinoceroses.

Following his retirement from the university in 2012, Richard owned and operated SoRhoVet LLC, a solo equine theriogenology practice while continuing his elephant research.

The name SoRho is a tribute to his homeland, Southern Rhodesia, the country he loved and missed.

Dr Fayer-Hosken was a Diplomate of the American College of Theriogenologists, receiving the Theriogenologist of the Year award in 1999 for 'Research in population control of the African elephant'. He was a Founding Diplomate of the European College of Animal Reproduction and was elected Research Fellow of the San Diego Zoo Institute for Conservation Research in 2009. Richard was active in several professional organisations including the American Association of Equine Practitioners and the European College of Animal Reproduction, which certified him as a European Veterinary Specialist in Animal Reproduction. He rose to President of the American College of Theriogenologists and the International Embryo Technology Society.

Richard joined IETS in 1985 as a student member where he developed lifelong friendships and collaborations. He joined the IETS Foundation board in 1998 and presided as President from 2009–2011. He was a founding member of the Affiliate Society Committee, which he developed and led until his passing. Richard was elected to the Board of Governors, serving as Treasurer, Vice President and President in 2009. That year the annual IETS conference was scheduled for New Orleans, but Katrina struck, leaving Richard to pilot the Board in the Herculean task of changing the venue to San Diego just 9 months before the meeting.

Dr Fayer-Hosken authored or coauthored over 250 scientific papers, articles, abstracts and book chapters, and spoke frequently at scientific and speciality group meetings around the world. He developed and taught dozens of continuing education courses covering a wide range of topics including infertility in dogs and cats, bovine physiology, integrated interactive learning systems for veterinary education, and equine oocyte maturation and sperm receptor mechanisms. Despite his rigorous teaching and clinical duties, Richard volunteered his time with several animal rescue groups and was a tireless advocate for animal welfare. As a testament to his commitment to the health and safety of all animals, he once risked incarceration by rescuing a horse from a research facility that was planning to conduct a painful experiment. He was indeed arrested, but when the details of the animal treatment were revealed he was released and subsequently championed for his act of compassion. Richard's love of animals was most evidenced by his devotion to his treasured Jack Russell terriers.

One aspect of Richard's life was not well known by his colleagues; he loved rugby. He enjoyed this sport as a player and a coach. Richard became the University of Georgia Rugby Club Coach in 1988. Cw. Young wrote, 'Richard's teams of the late 80's were known for their toughness and their unrelenting style of smash mouth rugby. One player described his arrival: 'He came out of nowhere. He organised us, focussed us, and he made an immediate impact. His coaching was transformational and we loved him.' Another player described him as 'pivotal to the progress of the club as a whole.' Ryan Brenny recalled Richard's coaching style. 'When it came to coaching, he wasn't a tactician, he was more like a Drill Sergeant. He taught us how to be tough first. Then he taught us the game. He was the coach we needed at that time.' Ryan added 'Every training started with the tradition of 'running the hill' and Tuesdays were for fitness and drills while Thursdays were reserved for full contact scrimmages. 'We

loved it! After listening to Ryan and a few other players from this era, I think it's fair to everyone involved to say Richard Fayer-Hosken and his 'tough but fair' style of coaching and leadership galvanised our young club and he gave us what every great team must have - an identity.' 'Goodbye for now, you total badass'. 'May you rest in peace. #RHODESIA' (Young 2019; <https://www.ugarugby.com/single-post/2019/07/10/Coach-Richard-Fayer-Hosken-1954-2019>, accessed July 10 2019).

Although Richard's contributions to reproductive biology spanned many species including dogs, cats, rabbits, hamsters, cattle, sheep, goats, deer, and rhino, his main focus was horses and his beloved African Elephant. His early work with zonae pellucida (Fayer-Hosken and Brackett 1987) to develop assay systems for assessing capacitation of sperm began a lifelong fascination with how the zona could be exploited for studies of fertilization and immunocontraception. Richard showed that salt-stored zonae had similar penetration rates as zona-free hamster oocytes with in utero and washed and incubated rabbit spermatozoa. The salt-stored zonae were much easier to prepare and handle. He continued his studies into capacitation of rabbit spermatozoa and showed that cholesterol sulfate could reversibly inhibit the fertilizing ability of spermatozoa *in vitro* (Fayer-Hosken *et al.* 1987a).

Richard moved from rabbit fertilization to study *in vitro* maturation and *in vitro* fertilization in cattle (Fayer-Hosken *et al.* 1989; Schellander *et al.* 1989; Younis *et al.* 1989; Brackett *et al.* 1989). He made numerous contributions to this area including showing for the first time that when E2 and FSH or LH were added to the *in vitro* maturation medium, the *in vitro* development of bovine embryos after IVF was vastly improved. These additives are routinely used in bovine oocyte *in vitro* maturation systems to this day.

While studying fertilization, Richard became interested in the zona pellucida's ability to enhance as well as inhibit fertilization. He began his initial studies to examine the ability of zona pellucida proteins to act as immunogens for potential use as immunocontraceptives. Dr Fayer-Hosken began his work by investigating the use of pig zona pellucida (pZP) for immunocontraception (Kirkpatrick *et al.* 1996). He applied this work in the field to control populations of wild horses and donkeys in the American Western States. His results showed 'A single annual booster inoculation was capable of maintaining contraception. Seven consecutive years of pZP treatment in wild mares resulted in no detectable debilitating side effects, and reversibility of contraception has been documented among mares treated for up to 4 consecutive years.' Richard also used pZP immunocontraception on white-tailed deer, with no detectable changes in ovarian histology after 2 years of treatment.

In the mid-1990s, Richard postulated that pZP might be a potential way to control elephant populations in his beloved Africa. He began by evaluating the chemical similarities between elephant (*Loxodonta africana*) zona pellucida glycoproteins (eZP) and porcine zona pellucida glycoproteins (pZP) (Fayer-Hosken *et al.* 1999). The results of this study showed 'eZP of primary, secondary and tertiary follicles was recognised by the rabbit-anti-pZP serum, but there was no apparent recognition of the primordial follicles. The ability of anti-pZP antibodies to recognise the eZP demonstrates that there is molecular homology between the pZP and eZP glycoproteins.' Richard and

colleagues then vaccinated three captive female elephants with pZP with a synthetic adjuvant. The elephants developed significant titers to pZP, which persisted for 12 to 14 months after vaccination. That preliminary evidence showed female elephants can develop significant serum antibody levels to pZP. The pZP antibody levels were comparable to those required for successful immunocontraception in horses. These discoveries set the course for the remainder of Richard's academic and scientific career. They led to many subsequent studies on immunocontraception in elephants (Fayrer-Hosken *et al.* 2000b; Barber and Fayrer-Hosken 2000a; Delsink *et al.* 2002; Barber *et al.* 2001; Presotto *et al.* 2019). He conducted additional immunocontraception studies with diverse species including dog, cat, goats, sheep and hamster (Barber *et al.* 2001; Fayrer-Hosken *et al.* 2002; Stoops *et al.* 2006; Jiménez-Movilla *et al.* 2009).

One of Richard's most endearing scientific qualities was his ability to take a complex problem and break it down into finite parts that could be studied. He pursued his research with energy and passion. Richard treated colleagues and students with utmost respect. He was a gentleman! Therefore, in recognition of the significant contributions he has made over the last 34 years, the IETS is proud to award Dr Ricard Arthur Fayrer-Hosken with the 2020 Lifetime Achievement award.

Sadly, Richard passed away on June 30, 2019. A son of Rhodesia has been called home. He exemplified a life well lived full of inquiry, consequence, impact and a love of animals. He will be deeply missed by his family, friends and colleagues! Richard left us too soon but we are richer for having known him.

The IETS Fayrer-Hosken Affiliate Scholarship Fund has been established in Richard's name.

You can donate by clicking 'Make an Online Foundation Donation' on the IETS homepage, sign in and click 'Make a Donation'.

References

- Barber, M. R., and Fayrer-Hosken, R. A. (2000a). Possible mechanisms of mammalian immunocontraception. *J. Reprod. Immunol.* **46**(2), 103–124. doi:10.1016/S0165-0378(99)00063-7
- Barber, M. R., and Fayrer-Hosken, R. A. (2000b). Evaluation of somatic and reproductive immunotoxic effects of the porcine zona pellucida vaccination. *J. Exp. Zool.* **286**(6), 641–646. doi:10.1002/(SICI)1097-010X(20000501)286:6<641::AID-JEZ11>3.0.CO;2-#
- Barber, M. R., Lee, S. M., Steffens, W. L., Ard, M., and Fayrer-Hosken, R. A. (2001). Immunolocalization of zona pellucida antigens in the ovarian follicle of dogs, cats, horses and elephants. *Theriogenology* **55**(8), 1705–1717. doi:10.1016/S0093-691X(01)00514-3
- Barsanti, J. A., Finco, D. R., Mahaffey, M. M., Fayrer-Hosken, R. A., Crowell, W. A., Thompson, F. N., Jr., and Shotts, E. B. (2000). Effects of an extract of *Serenoa repens* on dogs with hyperplasia of the prostate gland. *Am. J. Vet. Res.* **61**(8), 880–885. doi:10.2460/AJVR.2000.61.880
- Brackett, B. G., Younis, A. I., and Fayrer-Hosken, R. A. (1989). Enhanced viability after *in vitro* fertilization of bovine oocytes matured *in vitro* with high concentrations of luteinizing hormone. *Fertil. Steril.* **52**(2), 319–324. doi:10.1016/S0015-0282(16)60862-2
- Brandon, C. I., Srivastava, P. N., Heusner, G. L., and Fayrer-Hosken, R. A. (1997). Extraction and quantification of acrosin, beta-N-acetylglucosaminidase, and arylsulfatase-A from equine ejaculated spermatozoa. *J. Exp. Zool.* **279**(3), 301–308. doi:10.1002/(SICI)1097-010X(19971015)279:3<301::AID-JEZ11>3.0.CO;2-C
- Brandon, C. I., Heusner, G. L., Caudle, A. B., and Fayrer-Hosken, R. A. (1999). Two-dimensional polyacrylamide gel electrophoresis of equine seminal plasma proteins and their correlation with fertility. *Theriogenology* **52**(5), 863–873. doi:10.1016/S0093-691X(99)00178-8
- Delsink, A. K., van Altena, J. J., Kirkpatrick, J., Grobler, D., and Fayrer-Hosken, R. A. (2002). Field applications of immunocontraception in African elephants (*Loxodonta africana*). *Reprod. Suppl.* **60**, 117–124.
- Fayrer-Hosken, R. (1997). Anatomy and physiology of the bull's reproductive system. *Vet. Clin. North Am. Food Anim. Pract.* **13**(2), 195–202. doi:10.1016/S0749-0720(15)30335-2
- Fayrer-Hosken, R. (2007). Embryo transfer in the dog and cat. *Theriogenology* **68**(3), 382–385. doi:10.1016/J.THERIOGENOLOGY.2007.05.052
- Fayrer-Hosken, R. (2008). Controlling animal populations using anti-fertility vaccines. *Reprod. Domest. Anim.* **43**, 179–185. doi:10.1111/J.1439-0531.2008.01159.X
- Fayrer-Hosken, R. A., and Brackett, B. G. (1987). Use of salt-stored zona pellucidae for assessing rabbit sperm capacitation for *in vitro* fertilization. *Gamete Res.* **17**(3), 191–201. doi:10.1002/MRD.1120170302
- Fayrer-Hosken, R. A., and Caudle, A. B. (1991). The laparoscope in follicular oocyte collection and gamete intrafallopian transfer and fertilization (GIFT). *Theriogenology* **36**(5), 709–725. doi:10.1016/0093-691X(91)90337-D
- Fayrer-Hosken, R. A., Brackett, B. G., and Brown, J. (1987a). Reversible inhibition of rabbit sperm-fertilizing ability by cholesterol sulfate. *Biol. Reprod.* **36**(4), 878–883. doi:10.1095/BIOLREPROD36.4.878
- Fayrer-Hosken, R. A., Reynolds, D. C., and Brackett, B. G. (1987b). An efficient rabbit artificial vagina and its use in assessing sperm fertilizing ability *in vitro*. *Lab. Anim. Sci.* **37**(3), 359–361.
- Fayrer-Hosken, R. A., Younis, A. I., Brackett, B. G., McBride, C. E., Harper, K. M., Keefer, C. L., and Cabanissa, D. C. (1989). Laparoscopic oviductal transfer of *in vitro* matured and *in vitro* fertilized bovine oocytes. *Theriogenology* **32**(3), 413–420. doi:10.1016/0093-691X(89)90007-1
- Fayrer-Hosken, R. A., Caudle, A. B., and Shur, B. D. (1991). Galactosyltransferase activity is restricted to the plasma membranes of equine and bovine sperm. *Mol. Reprod. Dev.* **28**(1), 74–78. doi:10.1002/MRD.1080280112
- Fayrer-Hosken, R. A., Durham, D. H., Allen, S., Miller-Liebl, D. M., and Caudle, A. B. (1992a). Follicular cystic ovaries and cystic endometrial hyperplasia in a bitch. *J. Am. Vet. Med. Assoc.* **201**(1), 107–108.
- Fayrer-Hosken, R. A., Huber, T. L., Miller, D. M., Thompson, F. N., and Caudle, A. B. (1992b). Infertility in a ewe as a result of ovotestis. *J. Am. Vet. Med. Assoc.* **200**(10), 1528–1529.
- Fayrer-Hosken, R. A., Bertschinger, H. J., Kirkpatrick, J. F., Grobler, D., Lamberski, N., Honneyman, G., and Ulrich, T. (1999). Contraceptive potential of the porcine zona pellucida vaccine in the African elephant (*Loxodonta africana*). *Theriogenology* **52**(5), 835–846. doi:10.1016/S0093-691X(99)00176-4
- Fayrer-Hosken, R. A., Dookwah, H. D., and Brandon, C. I. (2000a). Immunocontrol in dogs. *Anim. Reprod. Sci.* **60–61**, 365–373. doi:10.1016/S0378-4320(00)00139-1
- Fayrer-Hosken, R. A., van Altena, J. J., Bertschinger, H. J., and Kirkpatrick, J. F. (2000b). Immunocontraception of African elephants. *Nature* **407** (6801), 149. doi:10.1038/35025136
- Fayrer-Hosken, R. A., Barber, M. R., Crane, M., Collins, T., and Hodgden, R. (2002). Differences in immunocontraceptive responses in white-tailed deer (*Odocoileus virginianus*) and goats (*Capra hircus*). *Reprod. Suppl.* **60**, 125–129.
- Fayrer-Hosken, R. A., Stanley, A., Hill, N., Heusner, G., Christian, M., de la Fuente, R., Baumann, C., and Jones, L. (2012). Effect of feeding fescue seed containing ergot alkaloid toxins on stallion spermatogenesis and sperm cells. *Reprod. Domest. Anim.* **47**(6), 1017–1026. doi:10.1111/J.1439-0531.2012.02008.X
- Fayrer-Hosken, R. A., Hill, N., Heusner, G. L., Traylor-Wiggins, W., and Turner, K. (2013). The effects of ergot alkaloids on the breeding stallion

- reproductive system. *Equine Vet. J. Suppl.* **45**, 44–47. doi:10.1111/EVJ.12164
- Gores-Lindholm, A. R., LeBlanc, M. M., Causey, R., Hitchborn, A., Fayrer-Hosken, R. A., Kruger, M., Vandenplas, M. L., Flores, P., and Ahlschwede, S. (2013). Relationships between intrauterine infusion of N-acetylcysteine, equine endometrial pathology, neutrophil function, post-breeding therapy, and reproductive performance. *Theriogenology* **80**(3), 218–227. doi:10.1016/J.THERIOGENOLOGY.2013.03.026
- Jiménez-Movilla, M., Martínez-Alonso, E., Castells, M. T., Izquierdo-Rico, M. J., Saavedra, M. D., Gutiérrez-Gallego, R., Fayrer-Hosken, R., Ballesta, J., and Avilés, M. (2009). Cytochemical and biochemical evidences for a complex tridimensional structure of the hamster zona pellucida. *Histol. Histopathol.* **24**(5), 599–609.
- Keefer, C. L., Fayrer-Hosken, R. A., Brown, L. M., and Brackett, B. G. (1988). Culture of *in vitro* fertilized rabbit ova. *Gamete Res.* **20**(4), 431–436. doi:10.1002/MRD.1120200405
- Kirkpatrick, J. F., Turner, J. W. Jr., Liu, I. K., and Fayrer-Hosken, R. A. (1996). Applications of pig zona pellucida immunocontraception to wildlife fertility control. *J. Reprod. Fertil. Suppl.* **50**, 183–189.
- Kirkpatrick, J. F., Turner, J. W. Jr., Liu, I. K. M., Fayrer-Hosken, R. A., and Rutberg, A. T. (1997). Case studies in wildlife immunocontraception: wild and feral equids and white-tailed deer. *Reprod. Fertil. Dev.* **9**(1), 105–110. doi:10.1071/R96052
- Knowles, S., Blas-Machado, U., Butler, A. M., Gomez-Ibañez, S. E., Lowder, M. Q., and Fayrer-Hosken, R. A. (2010). Ameloblastic fibro-odontoma associated with a retained molar in an Oldenburg mare. *J. Vet. Diagn. Invest.* **22**(6), 987–990. doi:10.1177/104063871002200625
- McBride, C. E., Fayrer-Hosken, R. A., Srivastava, P. N., and Brackett, B. G. (1990). Evaluation of rabbit sperm acrosomal integrity and fertilizing ability by use of vital stains. *Mol. Reprod. Dev.* **26**(1), 30–39. doi:10.1002/MRD.1080260106
- Miller, C. C., Fayrer-Hosken, R. A., Timmons, T. M., Lee, V. H., Caudle, A. B., and Dunbar, B. S. (1992). Characterization of equine zona pellucida glycoproteins by polyacrylamide gel electrophoresis and immunological techniques. *J. Reprod. Fertil.* **96**(2), 815–825. doi:10.1530/JRF.0.0960815
- Miller, C. C., Dunbar, B. S., and Fayrer-Hosken, R. A. (1994). Large-scale isolation of equine zonae pellucidae. *Theriogenology* **41**(4), 785–794. doi:10.1016/0093-691X(94)90495-5
- Mobley, J. L., Howerth, E. W., Beccar-Varela, A., Mueller, E., and Fayrer-Hosken, R. A. (2014). Pathology in practice. Granulosa cell tumor (GCT) of an ovary in a 2-year-old Savannah goat. *J. Am. Vet. Med. Assoc.* **244**(10), 1159–1161. doi:10.2460/JAVMA.244.10.1159
- Presotto, A., Fayrer-Hosken, R. A., Curry, C., and Madden, M. (2019). Spatial mapping shows that some African elephants use cognitive maps to navigate the core but not the periphery of their home ranges. *Anim. Cogn.* **22**(2), 251–263. doi:10.1007/S10071-019-01242-9
- Schellander, K., Fayrer-Hosken, R. A., Keefer, C. L., Brown, L. M., Malter, H., McBride, C. E., and Brackett, B. G. (1989). *In vitro* fertilization of bovine follicular oocytes recovered by laparoscopy. *Theriogenology* **31**(4), 927–934. doi:10.1016/0093-691X(89)90038-1
- Scherzer, J., Fayrer-Hosken, R. A., Ray, L., Hurley, D. J., and Heusner, G. L. (2008). Advancements in large animal embryo transfer and related biotechnologies. *Reprod. Domest. Anim.* **43**(3), 371–376. doi:10.1111/J.1439-0531.2007.00921.X
- Scherzer, J., Fayrer-Hosken, R. A., Aceves, M., Hurley, D. J., Ray, L. E., Jones, L., and Heusner, G. L. (2009). Freezing equine semen: the effect of combinations of semen extenders and glycerol on post-thaw motility. *Aust. Vet. J.* **87**(7), 275–279. doi:10.1111/J.1751-0813.2009.00452.X
- Srivastava, P. N., Sheikhnjad, R. G., Fayrer-Hosken, R., Malter, H., and Brackett, B. G. (1986). Inhibition of fertilization of the rabbit ova *in vitro* by the antibody to the inner acrosomal membrane of rabbit spermatozoa. *J. Exp. Zool.* **238**(1), 99–102. doi:10.1002/JEZ.1402380112
- Stoops, M. A., Liu, I. K. M., Shideler, S. E., Lasley, B. L., Fayrer-Hosken, R. A., Benirschke, K., Murata, K., van Leeuwen, E. M. G., and Anderson, G. B. (2006). Effect of porcine zonae pellucidae immunisation on ovarian follicular development and endocrine function in domestic ewes (*Ovis aries*). *Reprod. Fertil. Dev.* **18**(6), 667–676. doi:10.1071/RD05045
- Stuedemann, J. A., Hill, N. S., Thompson, F. N., Fayrer-Hosken, R. A., Hay, W. P., Dawe, D. L., Seman, D. H., and Martin, S. A. (1998). Urinary and biliary excretion of ergot alkaloids from steers that grazed endophyte-infected tall fescue. *J. Anim. Sci.* **76**(8), 2146–2154. doi:10.2527/1998.7682146X
- White, L. M., Warren, R. J., and Fayrer-Hosken, R. A. (1994). Levonorgestrel implants as a contraceptive in captive white-tailed deer. *J. Wildl. Dis.* **30**(2), 241–246. doi:10.7589/0090-3558-30.2.241
- Willis, P., Caudle, A. B., and Fayrer-Hosken, R. A. (1991). Equine oocyte *in vitro* maturation: influences of sera, time, and hormones. *Mol. Reprod. Dev.* **30**(4), 360–368. doi:10.1002/MRD.1080300411
- Willis, P., Caudle, A. B., and Fayrer-Hosken, R. A. (1994a). Fine structure of equine oocytes matured *in vitro* for 15 hours. *Mol. Reprod. Dev.* **37**(1), 87–92. doi:10.1002/MRD.1080370112
- Willis, P., Sekhar, K. N. C., Brooks, P., and Fayrer-Hosken, R. A. (1994b). Electrophoretic characterization of equine oviductal fluid. *J. Exp. Zool.* **268**(6), 477–485. doi:10.1002/JEZ.1402680608
- Young, C. W. (2019) Coach Richard Fayrer-Hosken, 1954–2019. (UGA Rugby Club: USA). Available at <https://www.ugarugby.com/single-post/2019/07/10/Coach-Richard-Fayer-Hosken-1954-2019> [Verified October 2019]
- Younis, A. I., Brackett, B. G., and Fayrer-Hosken, R. A. (1989). Influence of serum and hormones on bovine oocyte maturation and fertilization *in vitro*. *Gamete Res.* **23**(2), 189–201. doi:10.1002/MRD.1120230206