Minutes from the COST KeelBoneDamage Research Planning meeting, January 25/26, Bratislava, Slovakia

Present: Appendix A

Jan 25, 2017
Ongoing and Active research
1. Mike Toscano (4.CaTiming.MT.pptx)
    1.1. KBF and calcium timing in combination with 25-hydroxycaliciferol (HyD)
        1.1.1. High and continous egg production is generally considered as the main cause of KBF via a drain on bone mineral
        1.1.2. The current study plan is based on a 2X2 factorial with calcium load and HyD
        1.1.3. Hens would receive diets either with a standard level of calcium throughout the day or a reduced concentration in the diet and an access to calcium particulate for 2.5 h per day immediately before dusk. These treatments will be given in combination with or without HyD, a mix of minerals believed to facilitate calcium uptake.
        1.1.4. Diets will be given over a 8 week period with data collection including: hen- and pen-level egg production, pen-level feed consumption, impact testing to assess KBF susceptibility, long bone biomechanics and CT measures of Keel structural properties
        1.1.5. The study will begin in Jan 2015 and will involve Lazarin Lazarov of Bulgaria as an STSM
2. Dirk De-Konig (5.Gen.DK.pdf)
    2.1. Genetic measures of bone health
        2.1.1. DK reviewed exiting data on bone strength in layers including correlations with breaking strength and CT measures
        2.1.2. His lab has been using GWAS to pursue traits of interest
        2.1.3. Specific questions focus on linking SNPs from elite lines with commercial relevance and effects of housing, diet, and feather condition
        2.1.4. Initial findings suggest no effect of breed or feed supplement, but strong Genetic X Environment interactions
    2.2. He has a wealth of genetic data and techniques with possibilities to integrate CI data, FTIR, crystallography, biochem and SNP analysis
3. M Makagon (6.Beh.MM.pdf)
    3.1. Reviewed UC-Davis welfare faculty
    3.2. Lots of available equipment (xray, ultrasound, etc.) though often lack understanding of how to use!
    3.3. Current projects
        3.3.1. Furnished cage housing using keel-placed accelerometers
            3.3.1.1. Currently wrapping up with S Baker as a Masters
            3.3.1.2. 80% of collisions greater than 20 G, mostly while ascending ONTO perches
        3.3.2. Impact of rearing environment on hen behaviour in enriched colony cages
        3.3.3. FFAR with two sub-projects
            3.3.3.1. Prevalence of KBF in commercial US flocks
            3.3.3.2. Evaluation of multi-tier pullet rearing on development, including spatial awareness and trajectory of KBD

3.3.4. Makagon needs
    3.3.4.1.   Alternative methods for keel bone assessment
    3.3.4.2.   Techniques for assessing poultry perception (aerial vs. linear perspectives, distance cue marking
    3.3.4.3.   Guidance on bone parameter analysis; SG suggested to include muscle as well as bone development
    3.3.4.4.   Assistance with cognitive measures
    3.3.4.5.   Post doc needed

4. Bas Rodenburg (7.Phen.BR.pdf)
  4.1. Current projects include
    4.1.1. Incubation and early life condition on behavioral development
      4.1.1.1.   Influences of light and noise
      4.1.1.2.   Investigation of dark brooders
    4.1.2. Core Organic FreeBirds Project
      4.1.2.1.   Using early life development to influence later health
      4.1.2.2.   Automated tracking of individuals
      4.1.2.3.   Relate free range use to a variety of issues including KBD, leg health and other issues
    4.1.3. Phenolab tracking system has many possibilities for collaboration

5. Ine Kempen (8.LghtCa.IK.pdf)
  5.1. In general, the province of Antwerp's Experimental Poultry Center balances science and practice with multiple large scale commercial facilities available for research
  5.2. Current projects to reduce KBD
    5.2.1. Adapted lighting program in rearing
      5.2.1.1.   Slow stepdown programs to stimulated appetite and ensure rapid early growth
      5.2.1.2.   Delaying initiation of sexual maturity to enhance formation of cortical bone
      5.2.1.3.   Beneficial effects on egg quality and production
      5.2.1.4.   New trial will examine two treatment lighting programs to ideally better detect pattern differences. Ideally will include keel measures as well
    5.2.2. Split feeding in laying phase – providing different nutrients at different times
      5.2.2.1.   1300 hens/group
      5.2.2.2.   CON diet compared against Split with 1 diet in morning and high Ca diet in afternoon
      5.2.2.3.   Problems include:
        5.2.2.3.1.   mixing of diets
        5.2.2.3.2.   optimizing feeding times
        5.2.2.3.3.   likely minor effects with difficult application
      5.2.2.4.   Initial results suggest no difference in performance or egg quality
      5.2.2.5.   New trial will include provision of coarse limestone in afternoon from 85 to 100 weeks

6. Ian Dunn (9.GenPhen.ID.pdf)
  6.1. Need for assessment critieria of genetic traits that can be made on living hens, high throughput and simple, made early in life and good predictors of later bone quality

      6.2. Previous efforts
          6.2.1. Ultrasound of toe/humerus but likely problems with medullary bone
          6.2.2. Palpation is helpful but problems with environment and subjectivity
          6.2.3. Densitometry (Xray) has potential but concerns with cost, time, and safety
          6.2.4. Digitised fluoroscopy
      6.3. Renewed interest in Xray
          6.3.1. Need protocols to ensure safe and welfare friendly methods, which bones are most effective, and rapid image analysis
      6.4. FFAR grant seeks to develop commercially valid methodology
          6.4.1. Validating an xray method that is safe and can obtain genetic
          6.4.2. parameters that relate to qualities in dissected bones

7. Mike Toscano (13.RearDev.MT.ppt)
      7.1. Commercial trial comparing two multi-tier rearing environments (with tiers directly stacked or offset) each with or without ramps (4 treatment combinations, 2 pens/TC, 355 hens/pen. Hens are then followed into the lay environment which contains only directly stacked tiers but has either ramps or no ramps (4 pens/combination, 220 hens/pen).
          7.1.1. Rearing data includes: video observations throughout rearing focusing on movement and then bone collection (tibia, humerus, keel) for biomechanical testing and computer tomography of bone structure (keels only)
          7.1.2. Laying data includes: five radiological assesments of keel bones and video observations focusing on movement as well as automated tracking of individuals

8. Beryl Eusemann completed STSM (10.EggProd.BE.pptx)
      8.1. Investigating role of egg production as a cause of KBF by suppressing egg production with desorelin actetate
      8.2. Used 200 hens in a 2X2X2 factorial deign (Factor 1: High/Low laying strains; Factor 2: Egg suppression/Control; Factor 3: Estradiol supplement)
      8.3. Ultrasound of ovary to confirm follicle absence (every 3 wks); measument of plasma estradiol
      8.4. Radiograph of keel at 7 times (12 thru 60 WoA)
          8.4.1. Fracture yes/no, relative deviation size, keel length and surface area, radiographic density
      8.5. Euthanasia at 60 wks
          8.5.1. Histology
          8.5.2. Tibiotarsus quality and breaking strength
      8.6. Initial results
          8.6.1. Successful suppression of egg production
          8.6.2. Substantial reduction in fracture incidence and keel bone length with suppression of egg production

9. Nikki Mackie completed STSM (11.AvAcc.NM.pptx)
      9.1. Visited Frank Tuyttens lab ton examine some relationships (KBF and footpad lesions, ramps) seen in non-commercial conditions on farm
      9.2. Flocks with ramps had less KBF, bumblefoot, and more upward movements during dusk period
      9.3. Increased rate of falls during climbing (no ramp effect)

10. Vida Rezar completed STSM (12.SerbKBD.VR.pdf)
      10.1.   STSM to survey KBD in Serbian flocks

10.2.   44.9% of flocks (3.7 MIL hens) have 49 or less hens; 38.2% more than 5K hens (3.2 Mil hens)

10.3.   For 21st farms surveyed 50-300 hens/farm

    10.3.1.   Examined prevalence of damage and mineral content

    10.3.2.   KBD seen in all systems except organic production

    10.3.3.   Highest rate (39%) seen in enriched cages that were fully equipped with cages

    10.3.4.   Large differences in keel mineralization

    10.3.5.   Very interesting pictures regarding typical flocks in Serbia!

11. MT discussed need to re-orient resources of the Action
    11.1.   There seems to be less European-based active research applications on KBD
    11.2.   The Action should adapt and be focusing less money on planning for 'big' research projects
    11.3.   Focus should instead be on:
        11.3.1.   Interventions with stakeholders whom do not recognize KBD as a problem (e.g. Slovenia, Serbia, Croatia)
        11.3.2.   Resolution strategies for nations that do recognize KBD as a problem (UK, CH, Sweden, DK)
        11.3.3.   STSM with existing work and/or opportunities for capacity building
            11.3.3.1. Agreed to increase flexibility in which STSMs will be accepted
            11.3.3.2. Open enrolment would now be encouraged as well as proposed topics
            11.3.3.3. Goal should be that each nation should be either hosting or proposing an STSM, or both!
            11.3.3.4. Individuals should be working to incorporate STSMs into future planned work, e.g.,1 chapter of a thesis and/or actively recruit those who would be able to work!
12. Potential STSMs
    12.1.   U Bern: Computer Tomography of keels (with mentioned 2 projects)
        12.1.1.   GP2 or GP3
        12.1.2.   Best time is May 2018 thru August 2018
    12.2.   U Bern: Blood analysis of bone resorption factors (Ca Timing project)
        12.2.1.   GP2 or GP3
        12.2.2.   Best time is May 2018 thru August 2018
    12.3.   Slovenia: Physiological parameters and KBD
        12.3.1.   GP2 with potential applicant SP
    12.4.   U Bern/Bristol/Vencomatic: Attracting young chicks to use elevated areas
        12.4.1.   GP3 or 4
        12.4.2.   After Nov 2018
    12.5.   U Bern: Development of 3D models for KBD training
        12.5.1.   GP3 or 4
        12.5.2.   Needs to be confirmed whether the Action could pay for materials (SG)
    12.6.   Roslin: Machine learning for BMD assessment
        12.6.1.   GP3
    12.7.   Sweden: Audit training
        12.7.1.   GP3 with potential applicants I Kempen and E Cavosuglu
    12.8.   Greece: KBD in alternative systems
        12.8.1.   GP3 with potential applicant MD-S
    12.9.   Germany: Daylight influence on bone strength
        12.9.1.   GP3 with potential applicants Nidq
    12.10.   Slovenia: Cognition and KBD
        12.10.1.   GP3 with applicants ED Haas
13. Potential Meetings
    13.1.   GP3: KBD assessment training (2 locations)

  13.1.1. Benelux focusing on scientific underpinnings (IK is LOS; interest from L Stadig, M Maiden, U Gur)

  13.1.2. Balkans with producer focus

 13.2. Introducing producers to KBD (Dissemination, meetings, STSMs)

  13.2.1. Integration with outputs to be developed at GP2 stakeholder input meeting in Croatia

  13.2.2. Options

   13.2.2.1. GP2 – MTs STSM with MZ in Slovenia (April 2018)

   13.2.2.2. GP3 – ZJ organizes a Dissemination meeting immediately before Croatian European Poultry Conference

   13.2.2.3. GP3 – a second Balkan training school in Serbia?

Appendix A – Attending

EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

MEETING ATTENDANCE LIST

ECOST-MEETING-CA15224-110218-088470

Meeting Title: Assessment measures coordination meeting		Start Date: 2018-01-25	End Date: 2018-01-26

Action Number: CA15224

Grant Holder: Ms Lilian Smith		

E-mail: Lilian.Smith@vetsuisse.unibe.c h	Tel: lilian.smith@vetsuisse.unibe.ch	Fax:

Nr	Participant	Country	Signature 25/01/2018	Signature 26/01/2018
1	Bilcik, Boris bbilcik@gmail.com	SK		
2	Brugger, Brigitte brigitte.brugger@mast.is	IS		
3	Cavusoglu, Enver envercavusoglu@gmail.com	TR		
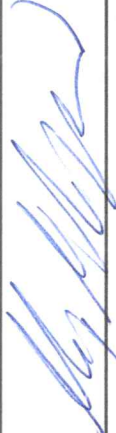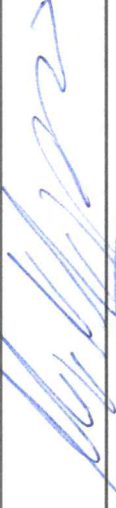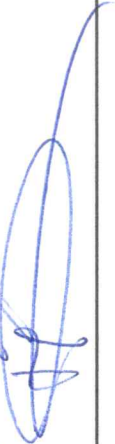
#	Name	Country	25.1.2018	26.1.2018
4	Dimitrov, Ivan iv.dimitrov@dir.bg	BG	*(signed)*	*(signed)*
5	Djukic Stojcic, Mirjana djukic@polj.uns.ac.rs	RS	*(signed)*	*(signed)*
6	Dumitrescu, Gabriela gbiocel@yahoo.com	RO		
7	Dunn, Ian ian.dunn@roslin.ed.ac.uk	UK	*(signed)*	*(signed)*
8	Eusemann, Beryl beryl.eusemann@fli.de	DE	*(signed)*	*(signed)*
9	Gebhardt-Hendrich, Sabine G. sabine.gebhardt@vetsuisse.unibe.ch	CH	*(signed)*	*(signed)*
10	Gonzalez Ovin, Tania Tania.GonzalezOvin@cost.eu	BE		
11	Guinebretiere, Maryse maryse.guinebretiere@anses.fr	FR		
12	Hansen, Tone Beate tone.beate.hansen@animalia.no	NO		
13	Ilieski, Vlatko vilieski@fvm.ukim.edu.mk	MK		
14	Janjecic, Zlatko zjanjecic@agr.hr	HR	*(signed)*	*(signed)*

2
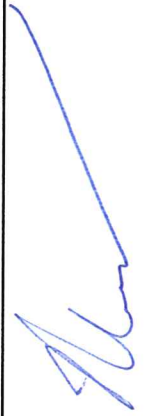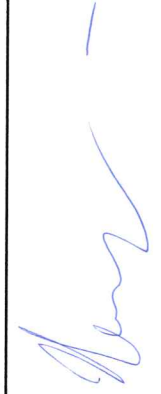
#	Name	Country	25.1.2018	26.1.2018
15	Kempen, Ine ine.kempen@provincieantwerpen.be	BE	*[signature]*	*[signature]*
16	Koning, Dirk-Jan DJ.de-koning@slu.se	SE	*[signature]*	*[signature]*
17	Kostal. Lubor Lubor.Kostal@savba.sk	SK	*[signature]*	*[signature]*
18	Larsen, ?jorgen Nyberg JNL@lf.dk	DK		
19	Mackie, Nikki nikki.mackie@bristol.ac.uk	UK	*[signature]*	*[signature]*
20	Makagon, Maja mmakagon@ucdavis.edu	US	*[signature]*	*[signature]*
21	Michel, Virginie virginie.michel@anses.fr	FR	*[signature]*	*[signature]*
22	Petow, Stefanie stefanie.petow@fli.de	DE	*[signature]*	*[signature]*
23	Pichova, Katarina pichovak@gmail.com	SK	*[signature]*	*[signature]*
24	Quintas, Mafalda mafalda.quintas@cost.eu	BE	*[signature]*	*[signature]*
25	Relic, Renata rrelic@agrif.bg.ac.rs	RS	*[signature]*	*[signature]*
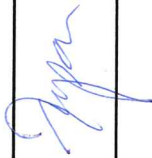
				25.1.2018	26.1.2018
26	Rezar, Vida vida.rezar@bf.uni-lj.si	SI		_signature_	_signature_
27	Rodenburg, Bas bas.rodenburg@wur.nl	NL		_signature_	_signature_
28	Rodriguez Navarro, Alejandro B. anava@ugr.es	ES			
29	Sabuncuoglu Coban, Nilufer nilcoban@gmail.com	TR		_signature_	_signature_
30	Saliba, Charles charlessaliba53@gmail.com	MT			
31	Saliba, Charles salibas@maltanet.net	MT			
32	Skalna, Zuzana zu.skalna@gmail.com	SK		_signature_	_signature_
33	Sossidou, Evangelia sossidou.arig@nagref.gr	EL		_signature_	_signature_
34	Stratmann, Ariane ariane.stratmann@vetsuisse.unibe.ch	CH			
35	Taranu, Ionelia ionelia.taranu@ibna.ro	RO			
36	Toscano, Michael michael.toscano@vetsuisse.unibe.ch	CH		_signature_	_signature_

#	Name	Country	25.1.2018	26.1.2018
37	Tuyttens, Frank frank.tuyttens@ilvo.vlaanderen.be	BE		
38	Williams, Mark mark.williams@britisheggindustrycouncil.com	UK		
39	Zupan, Manja manja.zupan@bf.uni-lj.si	SI	*Zupan*	*Zupan*
41				
42				
43				
44				

Country Codes: Belgium (BE), Bulgaria (BG), Croatia (HR), Denmark (DK), France (FR), Germany (DE), Greece (EL), Iceland (IS), Italy (IT), Malta (MT), Netherlands (NL), Norway (NO), Romania (RO), Serbia (RS), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), Turkey (TR), United Kingdom (UK), United States (US), fYR Macedonia (MK).

Meeting Secretary
(Chair or local organiser)
Name + signature:

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY