



POULTRY GENOME NEWSLETTER 2005

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YEAR OF THE CHICKEN CONTINUES

Following the Dec. 9, 2004, publication in *Nature* of the first thorough analysis of the draft chicken genome sequence (International Chicken Genome Sequencing Consortium, *Nature* 432:695–716, 2004), *Genome Research* came out with a “Special Chicken Section” in its January issue (Vol. 15, issue 1), featuring ten articles on a variety of topics related to chicken genomics and the use of the chicken sequence to annotate other genomes. The *Nucleic Acids Research* 2005 Database issue also included “**ChickVD: a sequence variation database for the chicken genome**” by Wang et al. (NAR 33:D438-D431, 2005), following up the chicken SNP paper that accompanied the genome sequence (International Chicken Polymorphism Map Consortium, *Nature* 432:717-722, 2004, see also <http://chicken.genomics.org.cn/index.jsp>)

The publication of the draft genome sequence was reviewed in our last issue. As a reminder, the sequence, along with a variety of viewing options and analytical tools, can be accessed at three different browsers: the UCSC Chicken Genome BrowserGateway, (<http://genome.ucsc.edu/cgi-bin/hgGateway?org=Chicken&db=0&hgid=30948908>); the NCBI Chicken Genome Resources, (<http://www.ncbi.nlm.nih.gov/genome/guide/chicken/>); and the EBI's Ensembl Chicken Genome Browser, (http://www.ensembl.org/Gallus_gallus/). See also the WUGSC chicken site at <http://genome.wustl.edu/projects/chicken/>. **Ensembl has appointed Jim Stalker (jws@sanger.ac.uk) as their chicken contact person** in charge of maintaining and enhancing their chicken web resources. He also serves as the project leader for the Ensembl Web Team.

PAG XIII & NAGRP/NC-1008 Meeting Report

A record crowd attended PAG-XIII this January at the usual spot, the Town and Country Hotel, San Diego, CA (www.intl-pag.org/). The NC-1008 Multistate Research project committee met concurrently, as did the National Animal Genome Research Program, NRSP-8. **Chris Ashwell**, chair for NRSP8-Poultry, and **Doug Foster**, chair of NC-1008, did a great job, keeping a full schedule close to on time throughout. It was interesting to see the impact of the draft genome sequence on poultry genetics. A useful historical perspective was provided by guest speaker, **Paul Siegel**. Some of the major new or continuing initiatives discussed included: correcting and annotating the genome sequence (**Groenen, Cheng, Miller, Leung**); transcriptional profiling, both with arrays and *in situ* hybridization (**Antin, Porter, Burnside, Zhu**); SNPs, both genome-wide and candidate SNPs and their potential applications (**Kaiser, Cheng, Zhang, Muir** and others); telomeres and other repetitive sequences (**Delany, Leung**); comparative avian genomics, especially of turkey (**Reed, Dodgson, Ashwell, Kirby**); and QTL and candidate genes (**Lamont, Kuo, Cheng, Ashwell, Wong, Rhoads, Kirby, Kuenzel, Leung, Kaiser, Miller and Zhu**). Particular QTL phenotype themes included infectious disease, reproduction and nutrient utilization. On the genome manipulation side, reports included a guest talk on sperm cryopreservation by **Julie Long**, cell line immortalization and ES cell efforts (**Foster**), PGC and

chimera development (**Petitte**) and use of retroviral vectors (**Petitte, Dodgson**). My apologies to anyone I've missed or misplaced above. **It was tentatively decided that next year's NC-1008/NRSP-8 poultry meeting will begin on Saturday morning (~9:00 am, Jan. 14, 2006) to more easily end by 4:00 pm on Sunday for the NRSP-8 business meeting.** Drs. Ashwell and Foster will continue to co-chair next year, assisted by **Kent Reed** (NRSP-8) and **Tom Porter** (NC-1008) as secretaries/chairs-elect. "Volunteer" objective coordinators for NC-1008 are **Mary Delany**, objective 1; **Jim Petitte**, objective 2 and **Sue Lamont**, objective 3. Congratulations also go to **Jason Hasenstein** of Iowa State U., this year's **Neal Jorgensen Travel Award** recipient for poultry. Jason presented a poster entitled "Analysis of Five *Gallinacin* Genes in a *Salmonella Enteritidis* Resource Population in Poultry", co-authored with **Guolong Zhang** and **Susan Lamont**.

WASHINGTON FUNDING UPDATE:

The **2005 NRI competitive grants program** has been announced (www.reeusda.gov/nri/). **Deadline dates are now May 17, 2005, for Animal Growth and Nutrient Utilization; and June 15, 2005, for Animal Genomics, Animal Genome Reagent & Tool Development and Functional Genomics of Agriculturally Important Organisms.**

Update on Animal Genome Reagent & Tool Development Program: Your Input Needed

As reported last issue, **Dr. Anna Palmisano**, Deputy CSREES Administrator for Competitive Programs (apalmisano@csrees.usda.gov) responded to concerns expressed over the possible sunset of the CSREES Animal Genome Reagent & Tool Development Program. At her invitation and with input from NRSP-8 members, the Species Coordinators submitted a justification for continuing this program with updated goals on Feb. 15, 2005 (available on request). Dr. Palmisano replied in a Feb. 25 email that read, in part (emphasis added by me): "Many thanks for your detailed response to our request for input regarding the future of the NRI 43.1 Animal Genome Reagent and Tool Development competitive grants program. **The program will continue to be offered (contingent upon the availability of funding). You will note, however, that the program description will be redesigned and refocused beginning with the FY 2006 NRI Request for Applications (RFA).**

We realize that our understanding of the various animal genomes is at a different level for each species. **During the next six months, we would like to encourage each NRSP-8 Species Coordinator to work with the members of the species subcommittee to identify the top three priorities for genome reagents and tools for that species.** By setting a limited number of specific priorities for each species, we feel that we can most efficiently use the time that is spent by those investigators that write and review proposals. Of equal importance, our limited dollars will be spent on reagents and tools that will be of most value to advancing the understanding of the genomes of agriculturally important animals and aquatic species.

We hope that the NRSP-8 Species Coordinators will accept this opportunity and provide the NRI with a list of their top three priorities for each of the species represented in NRSP-8. We would like your top three priorities for each species by the end of August 2005. While it is too late to include this information in the FY 2006 NRI RFA, we will be happy to include your recommendations during our FY 2007 NRI RFA planning process.

If you have suggestions for top priorities for Poultry Genome Tools & Reagents to be supported by CSREES, please email them AS SOON AS POSSIBLE to dodgson@msu.edu .

STOCK REPORT: AVIAN GENETIC RESOURCES REMAIN AT RISK

Avian Genetic Resources Survey II: TAKING STOCK OF OUR STOCKS

The Avian Resources website, <http://animalscience.ucdavis.edu/AvianResources/index.htm>, is surveying the present status of avian genetics stocks. **Mary Delany** sends the following:

“We thank those who have updated their information over the last few months and we look forward to hearing from those that we haven't yet heard from. If you see mistakes for your listings or contact information, don't hesitate to email (avgenstocks@ucdavis.edu) as we'll put up changes and new information as we go along. We will be working on the database content - streamlining the information and format over time, and also including more international stocks. Please also, if you know of other stocks that should be listed, let us know who/where and we will follow up. Special thanks to **Terri Gessarò** for all her work on this project.”

As reported last issue, a letter prepared by **Marcia Miller** of the **City of Hope National Medical Center** on behalf of 45 international co-signees was published by *Nature* in its December 16 issue (Vol 432: 799). This letter highlights the contrast between the new excitement about the chicken genome sequence and the fact that valuable chicken lines, that enable the use of the sequence to examine critical phenotypes, continue to be lost or are at risk of future facility closings or budget-related down-sizing. A copy that includes all the co-signers has been posted at, <http://poultry.mph.msu.edu/>, under “Information” and at the UC Davis Poultry and Avian Research Resources site, <http://animalscience.ucdavis.edu/AvianResources/>.

CHICKEN CHIPS

A 13K chicken spotted cDNA glass slide array is still available from the Array Facility at the Fred Hutchinson Cancer Research Center, FHCRC. A similar resource is available at **ARK-GENOMICS** at the Roslin Institute (<http://www.ark-genomics.org/resources/chicken.html>) for those outside the U.S. FHCRC arrays are available at \$150 per array. Email requests to genomics@fhcrc.org. **NAGRP Coordination funds have been used to make a small number of free test arrays available to NAGRP members. Additional sets have been secured; contact dodgson@msu.edu if interested. Additional slides can now be provided to those who've already received a set.** A technical report describing details of the construction and use of the arrays and the source of the cDNAs spotted can be downloaded from <ftp://milano.fhcrc.org/ArrayLab/chicken13k/tech.report/>.

Affymetrix, Inc. is now marketing their GeneChip® Chicken Genome Array. Their chip measures levels of 32,773 chicken transcripts and 684 chicken viral transcripts from 17 different avian viruses. These arrays are sold in sets of 2, 6 or 30. See <http://www.affymetrix.com/products/arrays/specific/chicken.affx> for additional info. and pricing.

ChickRH Web Server at INRA

Mireille Morisson, mmorisso@toulouse.inra.fr, and her colleagues at **INRA**, have developed the **ChickRH Web Server** in support of their ever-expanding chicken RH map. It's at <http://chickrh.toulouse.inra.fr>. This includes the ChickRH mapping tool (available anonymously) and the ChickRH database (registered users only). Registration is available at the site. Thanks to everyone at INRA for providing this valuable tool.

MORE CHICKEN WEB RESOURCES: ADD TO YOUR BOOKMARKS

Check out **ChickCmap** at <http://www.animalsciences.nl/cmap>. ChickCmap allows the alignment of the different available maps in chicken as well as the alignment with the human and mouse sequence maps. Cmap is free software available from the GMOD project (www.gmod.org), and ChickCmap has been developed by **Martien Groenen and colleagues at Wageningen U**. As noted previously, they have also developed the **ChickAce** database, available at <https://acedb.asg.wur.nl/> and the BAC contig server, **ChickFPC** at <http://www.animalsciences.nl/ChickFPC/>. Thanks, again, to Martien and his colleagues.

GEISHA, the Gallus gallus EST and in situ hybridization analysis database, developed by **Parker Antin and colleagues at the U. of Arizona** has been considerably updated. Check it out at <http://geisha.biosci.arizona.edu/>. Thanks to Parker and co-workers.

ON THE ROAD AGAIN. UPCOMING MEETINGS:

IMPORTANT NOTE: Regularly updated poultry meeting information is now available at http://www.animalgenome.org/share/mtg_chic.html. Meeting organizers can enter their own meeting information on-line at www.animalgenome.org/cgi-bin/angenmap/mtg_new.

54th Annual National Breeders Roundtable, May 5-6, 2005, Airport Marriott Hotel, St. Louis, MO. For more info., contact, Larry Brown at LBrown@poultryegg.org; Tel - (770) 493-9401, or George Ansah, Tel: (607) 257-6591; george.ansah@isapoultry.com

Chicken Genomics and Development Meeting, May 8-11, 2005. Cold Spring Harbor Laboratory, Cold Spring Harbor, NY. See <http://meetings.cshl.edu/meetings/chick05.shtml> for further information.

The Biology of Genomes, May 11-15, 2005, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY. See <http://meetings.cshl.edu/meetings/genome05.shtml> for more information.

1st International Cytogenetics and Genome Society Congress, June 14-18, 2005, University of Granada, Granada, Spain. See www.icgs-congress.org

14th Colloquium on Animal Cytogenetics and Gene Mapping, July 3-7, 2005, Puerto Vallarta, Mexico. See <http://www.cucba.udg.mx/14thnacacgm/>

Third International Symposium on Genetics of Animal Health, July 13-15, 2005, Iowa State University, Ames, Iowa. See www.ans.iastate.edu/bis/events/gah/GAH2005.html

Poultry Science Association Annual Meeting, July 31-Aug 3, 2005, Auburn University, Auburn, Alabama. see <http://www.poultryscience.org/>

2005 UC Davis Transgenic Animal Conference, Aug. 14-18, 2005, Granlibakken Conference Center, Tahoe City, CA. See <http://conferences.ucdavis.edu/TGAC>

Symposium on Integration of Structural and Functional Genomics (14th Annual Growth Factor and Signal Transduction Conference), September 22-25, 2005, Iowa State University, Ames, Iowa. See www.bb.iastate.edu/~gfst/homepg.html

The 16th Conference of the Association for the Advancement of Animal Breeding and Genetics, September 25-28, 2005, Noosa, Queensland, Australia. See www.aaabg.org.

Third European Poultry Genetics Symposium, October 6-8, 2005, Dubrovnik, Croatia. See: http://www.vef.hr/org/bolesti_peradi/wpsa-uzp/wpsa-uzp%20english.htm

Plant and Animal Genome XIV, joint with NC-1008 and NAGRP annual meetings, Jan. 14-18, 2006, Town & Country Convention Center, San Diego, CA. See www.intl-pag.org/.

CHICKEN: THE SEQUEL

Micheal Schmid reports that the “**Second Report of Chicken Genes and Chromosomes 2005**”, the sequel to the very successful “First Report” (Schmid et al., *Cytogenetics and Cell Genetics* 90:169-218 (2000)) will be published in issue 109/4 of the now *Cytogenetic and Genome Research* and should be out any day now. So much has happened in the interim, and yet it seems not that long ago that the First Report appeared.

Robert Shoffner

For anyone who has not yet heard, it's with great regret that we inform you that **Robert (Bob) Shoffner** passed away on January 1, 2005. Bob was a long-time leader in poultry genetics, and many of us have fond memories of, and great appreciation for, the wit and wisdom that he provided at NC-168 meetings and on other such occasions. The following is excerpted from comments made by U. of Minnesota Animal Science chairperson, **Abel Ponce de Leon**:

Shoffner, 88, was a pioneer in the studies of chromosome organization, chicken embryo development and chromosomal abnormalities. His research provided the pathway that a later generation of scientists used to improve poultry production.

His work at the University of Minnesota on poultry genetics spanned almost 60 years. “When he started his work, the word genomics didn't exist, modern laboratory tools hadn't been invented, and most people only ate chicken on special occasions. By the time he published his last scientific journal article in 1996, other scientists had applied his basic work to improve poultry production so that people throughout the world were eating chicken every day” . . .

IN THE NEWS

The **President's Interagency Working Group (IWG) on Domestic Animal Genomics 2004 Progress Report** is now available at <http://www.ostp.gov/nstc/html/recentnstcdocs.html> (click on “Coordination of Programs on Domestic Animal Genomics” to obtain the PDF). This provides an update on the 5-year plan that the IWG developed in 2003. The IWG has been chaired by **Dr. Joseph Jen**, USDA REE Undersecretary, and **Muquarrab Qureshi** and **Ronnie Green** provided substantial assistance from CSREES and ARS, respectively.

National Geographic's April, 2005, issue includes a short story in “Who Knew? The Science of Things” by **Joel Achenbach** on “**Meaty Chickens**” featuring quotes from **John Hardiman** and **Paul Siegel** on the amazing continued genetic progress in growth traits in broilers. Paul describes his own divergent selection lines: “We should have run out of genetic variation,” . . . “We haven't. Genetic progress seems to level off for a couple of generations and then responds to selection again.” He suggests that continued progress may be due to a higher mutation rate than expected. As mentioned last issue, the SNP analysis done in parallel with the genome sequence (International Chicken Polymorphism Map Consortium, *Nature* 432:717-722, 2004) confirms the remarkable level of genetic diversity that still exists in commercial chickens.

POULTRY MICROSATELLITES

Microsatellite primer kits: Information on chicken microsatellite primer pairs is at <http://poultry.mph.msu.edu/resources/microkits.htm>. A framework primer kit (147 well-spaced microsatellite primer pairs) called the "Comprehensive Mapping Kit #7" is available. Only this and the Population Tester Kit, designed for the rapid testing of the suitability of populations and/or chicken microsatellites for a given application, are still available. New Population Tester Kit primers have been obtained, so we now have these both fluorescent labeled or not. If interested, contact: hcheng@msu.edu or dodgson@msu.edu, describing your intended use.

THE BAC PAGE!

The **chicken BAC library** constructed at Texas A&M consists of over 115,000 BACs (~39,400 each in three sublibraries with *Bam*HI, *Eco*RI and *Hind*III partial digest inserts, called TAM31, TAM32, and TAM33, respectively; Lee et al., *Animal Genetics* 34: 151; Ren et al., *Genome Research* 13: 2754). Filter sets with 36,864 BACs from the *Bam*HI and *Hind*III sub-libraries are available, email dodgson@msu.edu. **Pieter de Jong** (Children's Hospital of Oakland Research Institute) has made a chicken BAC library with ~195 kb inserts (CHORI-261: ~73,700 BACs for ~12x haploid genome coverage). Pieter has also generated a **turkey BAC library (CHORI-260)** using DNA from an inbred Nicholas Turkey Breeding Farms bird. If interested in either library, see www.chori.org/bacpac/. **Coordination funds have been used to purchase several sets of CHORI-261 chicken BAC filter arrays and a set can be provided on request while supplies last. A limited number of the turkey CHORI-260 arrays have also been purchased are available on request.**

BAC Contig Physical Map; ChickFPC and ChickAce. The Washington U. Genome Sequencing Center BAC contig physical map, based on over 130,000 BAC fingerprints, is comprised of about 260 contigs, nearly 80% of which have been anchored to the genetic linkage/chromosome map (Wallis et al., *Nature* 432:761-764, 2004). As described above, the **ChickFPC** browser at <http://www.bioinformatics.nl/gbrowse/cgi-bin/gbrowse/ChickFPC> allows one to search the map using a known gene, marker, or BAC. BAC locations denoted by BAC end sequences can also be found on other sequence browsers mentioned above. At ChickFPC, BACs from the TAMU libraries have the prefix JB, JE, or JH for the *Bam*HI, *Eco*RI and *Hind*III insert libraries, respectively. CHORI-261 BACs have the prefix JA. White Leghorn BACs from the Crooijmans et al. library (*Mammalian Genome* 11: 360-363, 2000) have the prefix bW.

E-Version of the Poultry Newsletter: Save Some Trees?

Anyone who receives both an electronic and a hard copy of this newsletter and would like to cancel the latter, please email me at dodgson@msu.edu, and I'll be happy to remove you from our mail list. All our newsletters are archived at <http://poultry.mph.msu.edu/newsletters/newsletters.htm>, so you needn't worry about inadvertently deleting your electronic copy. For those, like me, who seem to be increasingly forgetful (let's blame it on having more things to remember rather than the ravages of age, shall we), this newsletter archive can be a good place to find that URL or other useful genome-related resource or factoid that you can't quite recall.

PLEASE PROVIDE YOUR INPUT

The Poultry Coordinators are always glad to hear from NRSP-8 members and other readers about ways that we can improve the coordination effort or resources that are needed and with which we may be able to help. Also, let us know, if you have items of general interest to the poultry genetics community that we can include in this Newsletter. Please email your Newsletter contributions to us by June 15 for the next issue.

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