



POULTRY GENOME NEWSLETTER 2005

Issue No. 1

January, 2005

HAPPY NEW YEAR! CHICKEN SEQUENCE PUBLISHED!

On Dec. 9, 2004, *Nature* published the first thorough analysis of the draft chicken genome sequence, “Sequence and comparative analysis of the chicken genome provide unique perspectives on vertebrate evolution”, by the International Chicken Genome Sequencing Consortium, *Nature* 432:695–716. This event received substantial publicity, world-wide, and is a fitting early start to the **Chinese Year of the Rooster** that officially begins on **Feb. 9, 2005**. As reported previously, the sequence was initially made public by the **Washington U. Genome Sequencing Center (WUGSC)** and the **National Human Genome Research Institute** on March 1, 2004. The sequence derives from a single (female) UCD001 inbred Red Jungle Fowl. Companion papers (more below) on the BAC contig map and SNP discovery were included in this issue of *Nature*, along with a commentary in News and Views. In addition, a number of additional companion papers already have received advance on-line publication by *Genome Research* and will appear in print in a special January issue.

Nature News highlighted the chicken genome sequence. For a look, see the *Nature* web focus at <http://www.nature.com/nature/focus/chickengenome/> and “**Chickens join the genome club**” by **Roxanna Khamsi** at <http://www.nature.com/news/2004/041206/full/041206-8.html>. The latter site also has a slide show overview of “**Chickens through history**” (click on the link at the previous URL or go to <http://foxtrot.nature.com/news/specials/chicken/index.html>). NIH also issue a press release highlighting this publication at <http://www.genome.gov/12514316>. A phone-in press conference was organized by Nature and substantial coverage resulted in newspapers, radio and TV around the world.

Using the Sequence. 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&hgsid=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/>.

BAC Contig Physical Map, ChickFPC and ChickAce. The WUGSC 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. This map provided an essential companion to the sequence assembly process. It's described in “**A physical map of the chicken genome**” by **Wallis et al.**, *Nature* 432:761-764. For information on how to access the BAC contig map and use this information, go to the browsers listed under “Using the Sequence” or see more information at the end of this newsletter on **The BAC Page**. The BAC map can also be obtained by ftp at <http://genome.wustl.edu/projects/chicken/>.

Domestic chicken sequences and chicken SNPs. As reported previously, the **Beijing Genome Institute** generated 0.25X whole genome shotgun sequence sets from each of a White Leghorn, a broiler, and a Silkie genome. Since the 6.6X draft sequence is from a Red Jungle Fowl, comparison of these three to it and to each other generated 2.8 million single nucleotide polymorphisms or SNP. This work is described in **A genetic variation map for chicken with 2.8 million single-nucleotide polymorphisms** by **The International Chicken Polymorphism Map Consortium**, *Nature* 432:717-722, and the data can be accessed at <http://chicken.genomics.org.cn/index.jsp> or the UCSC or Ensembl browsers.

PAG XIII & NAGRP/NC-1008 Meeting

PAG-XIII will be **January 15-19, 2005** at the usual spot, the **Town and Country Hotel, San Diego, CA**. See www.intl-pag.org/ for a schedule and registration information. Among others, Nobel Laureate **Rich Roberts** from New England Biolabs and **Bill Haseltine**, formerly of Human Genome Sciences, are scheduled to give plenary lectures. **The NC-1008 Multistate Research** project committee will meet concurrently, as will the **National Animal Genome Research Program, NRSP-8**. **Chris Ashwell**, chair for NRSP8-Poultry, and **Doug Foster**, chair of NC-1008, will co-organize the meeting, scheduled to start at 1:40 pm on Saturday, January 15 (schedule is posted at web site above). The NC-1008 meeting will end in time for the NRSP-8 business meeting, scheduled for 4:10 pm on Sunday.

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**. Total 2005 NRI funding remains was set at \$181M in the recently passed Consolidated Appropriations Act.

As reported in our last issue, the Animal Genome Reagent & Tool Development program that has been very successful is now scheduled to end after the 2005 year. In response to concerns expressed, **Dr. Anna Palmisano**, Deputy CSREES Administrator for Competitive Programs (apalmisano@csrees.usda.gov) responded at length on Oct. 1, including the following:

“We have just begun the planning process for the FY2006 RFA. If the NRI Animal Genome Reagents and Tools program continues beyond FY 2005, we feel that the emphasis of the program will need to change considerably. Therefore, we would like to challenge the NRSP-8 committee, including all of the species subcommittees, to address priority areas for the NRI Animal Genome Reagents and Tools program at the NRSP-8 business meeting . . . at the Plant & Animal Genome meetings in San Diego, CA. We request that the members of NRSP-8 present the NRI National Program Leaders with a list of 4 to 5 prioritized areas for possible inclusion in an FY 2006 NRI Animal Genome Reagents and Tools RFA, should the program be continued.” Thanks to Dr. Palmisano for her prompt and thoughtful reply.

Chicken Genomics and Development Meeting

Dave Burt and **Olivier Pourquié** are again organizing the (3rd annual) **Chicken Genomics and Development Meeting** to be held next year on **May 8-11, 2005** at Cold Spring Harbor Laboratory in Cold Spring Harbor, NY just prior to the Cold Spring Harbor's **The Biology of Genomes Meeting** on May 11-15. Plans and programs are incomplete at the moment. For further information as it develops, contact the organizers at Dave.Burt@bbsrc.ac.uk, or OLP@Stowers-Institute.org, respectively.

STOCK REPORT: AVIAN GENETIC RESOURCES REMAIN AT RISK

A letter prepared by **Marcia Miller** of the **City of Hope National Medical Center** on behalf of 45 international co-signees has been published by *Nature* in its December 16 issue. 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 downsizing. It also contrasts the existing status of chicken genetic resources with those of the mouse, for which facilities are expanding to accommodate new transgenic and other mutant stocks, and it calls for the development of one or more facilities for the chicken similar to what Jackson National Labs in Bar Harbor, ME now provides for the mouse. Thanks to Marcia for the major effort she put into organizing this submission and to *Nature* for accepting and printing it. A copy that includes all the co-signers will be posted on our web site, <http://poultry.mph.msu.edu/>, under "Information" and at the UC Davis Poultry and Avian Research Resources site, <http://animalscience.ucdavis.edu/AvianResources/>.

Avian Genetic Resources Survey II: TAKING STOCK OF OUR STOCKS

The Avian Genetic Resources Survey is back!! The organizers need your assistance in creating the most up-to-date information on extant poultry and avian genetic research resources. In 1999 the Avian Genetic Resources Task Force Report included a comprehensive stocks listing for North America (<http://www.grcp.ucdavis.edu/publications/index.htm>) as well as documented the elimination of 100's of stocks (as compared to the 1988 Poultry Registry developed by Ralph Somes). The curator and stocks listings are now largely out of date and it is clear that another round of substantial eliminations has taken place just in the last 5 yr. The Avian Genetic Resources Survey II (support by UC-Davis and the USDA-CSREES) seeks to update the prior information, assess the extent of the eliminations, include new stocks (there are a very few), include international stocks, and develop a web-based format for the resulting information (see url listed below). All curators listed in the prior survey will be contacted. If you have stocks and haven't been contacted (whether or not you were part of the first survey), then please consider sending an email to avgenstocks@ucdavis.edu to let us know who you are and how to contact you OR access the website to fill out the curator information form and the stocks form (<http://animalscience.ucdavis.edu/AvianResources/>) for email transmission. Suggestions are welcome, too. Mary Delany and Terri Gessaro, Avian Resources Program, 3304 Meyer Hall, University of California, One Shields Avenue, Davis, California 95616.

The **9th Discover Conference on Food and Agriculture** was held November 2-5, 2004 at the Plains Hotel in Cheyenne, Wyoming. "**Protecting and Managing Animal Genetic Resources for Future Generations: The Next Steps**" attracted approximately 80 U.S., Canadian and European registrants from the livestock industry, universities and governments. The conference provided a unique opportunity to follow-up on the progress made in securing animal genetic resources since the 3rd Discover Conference which was held in November of 1999. The 3rd Discover Conference provided a launching point for the USDA/ARS National Animal Germplasm Program (NAGP). Therefore, the 9th Conference provided an opportunity to take stock of what has been accomplished over the past five years and how to address animal genetic conservation issues over the next five years. There was a consensus that the program had made significant progress in addressing the animal genetic diversity agenda. At the time of the conference the national collection had grown to 150,000 samples of semen, embryos and blood from: 63 breeds of cattle, swine, sheep and goats, 43 chicken lines, and 17 aquatic species. Prepared by **Molly Kelley**, ADSA DISCOVER Conference Coordinator. Thanks to **Mary Delany** for the information. The full press release will be at <http://poultry.mph.msu.edu/> under "Information".

Dinner Banquet Honors Elwood and Ruth Briles

Friends, family and colleagues gathered at Northern Illinois University on Oct. 9 to honor **Elwood and Ruth Briles** for their contributions and achievements in the field of avian immunology. As most readers are aware, together, they are responsible for much of what is known today about avian blood groups in the chicken. Many of their colleagues were in attendance, including **Muquarrab Qureshi**, who presented the couple with a certificate of achievement on behalf of the Cooperative State Research, Education and Extension Service of the U.S. Department of Agriculture. Thanks to **Mary Delany** for this info. More details at: <http://www.niu.edu/northerntoday/2004/oct18/kudos.shtml>

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.** 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.

ON THE ROAD AGAIN. UPCOMING MEETINGS:

Plant and Animal Genome XIII, joint with NC-1008 and NAGRP annual meetings, Jan. 15-19, 2005, Town & Country Convention Center, San Diego, CA. See www.intl-pag.org/.

Advances in Genome Biology & Technology and Automation in Mapping & DNA Sequencing, Feb. 9-12, 2005, Marco Island, Florida. See www.agbt.org.

Gordon Conference on Quantitative Genetics and Genomics, Feb. 20-25, 2005, Ventura Beach Marriott, Ventura, California. See <http://www.grc.org/programs/2005/quantgen.htm>

Chicken Genomics and Development Meeting, May 8-11, 2005. Cold Spring Harbor Laboratory, Cold Spring Harbor, New York. Contact David Burt, Dave.Burt@bbsrc.ac.uk, or Olivier Pourquié, OLP@Stowers-Institute.org 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.

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

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

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.

POULTRY MICROSATELLITES

Microsatellite primer kits: Information on chicken microsatellite primer pairs can be found at <http://poultry.mph.msu.edu/resources/microkits.htm>. A version of a framework primer kit (with 147 well-spaced microsatellite marker 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, as demand has waned in recent months. New Population Tester Kit primers have been obtained, so we now have these both fluorescent labeled or not. If interested, contact: (dodgson@msu.edu) or (hcheng@msu.edu), describing your desired 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.** Pieter's group has also constructed a **fosmid library** using the same source DNA. If interested, contact BACPAC at www.chori.org/bacpac/.

BAC Contig Physical Map; ChickFPC and ChickAce. As noted above, the WUGSC 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., in press). The mapping effort has been led by **Wes Warren** and **John Wallis** at WUGSC with assistance from **Jan Aerts** and **Martien Groenen** of Wageningen U. and others. The Wageningen group has also developed the **ChickFPC** browser in AceDB format at <http://www.bioinformatics.nl/gbrowse/cgi-bin/gbrowse/ChickFPC>, allowing one to search the map beginning with a known gene, marker, or BAC. Similarly, BAC locations denoted by BAC end sequences can be found on other sequence browsers noted 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. See also the **ChickAce** chicken genome mapping database with emphasis on linkage, cytogenetic, radiation hybrid and BAC contig maps as well as mapping information for phenotypic traits such as QTL at <https://acedb.asg.wur.nl/>.

PUT YOUR ITEM OF INTEREST HERE

We're happy to include items of general interest to the poultry genetics community in this Newsletter. Please email your contributions to us by March 15 for the next issue.

Supported by Multi-State Research Funds to the National Research Service Program: NRSP-8. National Animal Genome Research Program, Muquarrab Qureshi, NAGRP Director, CSREES

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