



BBSRC-FAPESP JOINT PUMP-PRIMING AWARDS for AMR and INSECT PEST RESISTANCE IN AGRICULTURE: *Understanding and managing resistance, including novel methods, for pathogen and pest control.*

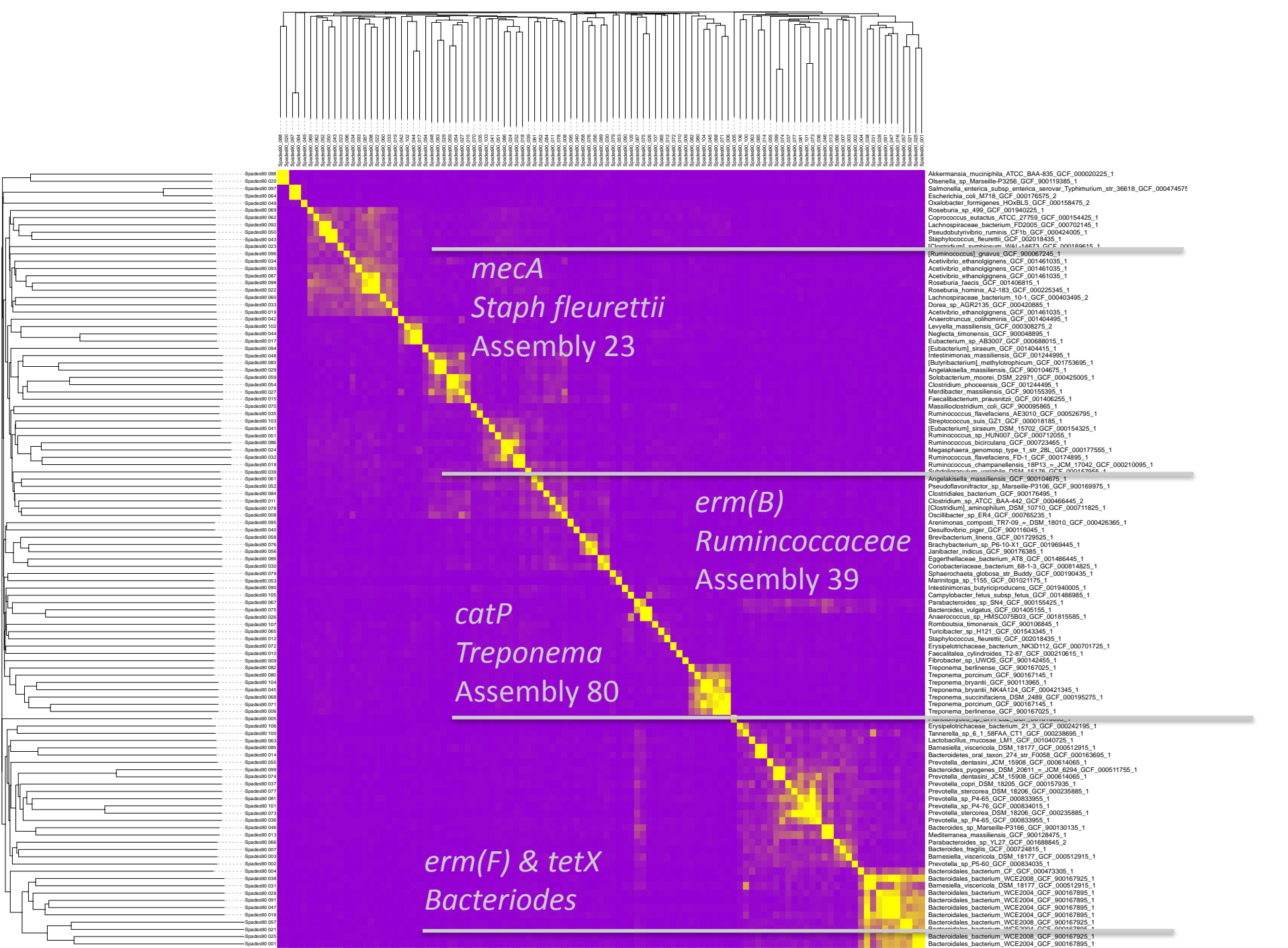
Dr Mark Holmes

Reader in Microbial Genomics and Vet Science
University of Cambridge
Dept of Veterinary Medicine

mah1@cam.ac.uk

Dynamics of AMR genes (metagenomics)

- Dynamics of AMR genes (metagenomics)
- Where do they come from, where to they go
- HiC (chromosome conformation metagenomics)
- Metagenomes that create better assemblies of constituent genomes
 - Plasmids included
 - Uncultured bacteria

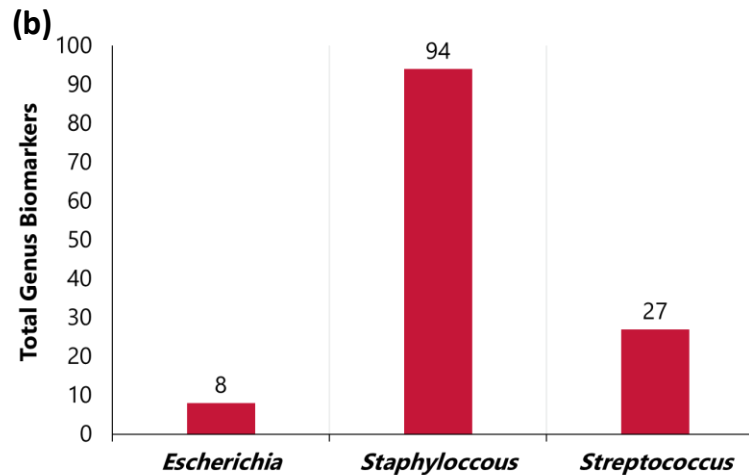
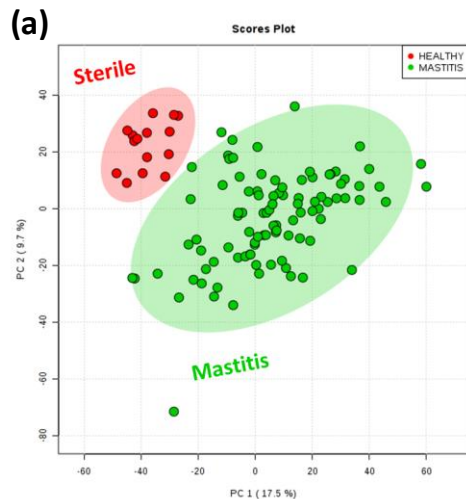


Livestock associated MRSA

- Lineages of MRSA found in farm animals and are transmitted to people.
- ST398 (Europe & America), ST9 (China)
- Sequencing and molecular epidemiology
- Functional genomics
 - Using transposon mutant libraries
 - Investigating the mechanisms of host adaptation (or lack of it)

Rapid Bacterial Diagnosis

- Need for instant diagnosis from clinical sample
 - E.g. Bovine mastitis – from milk – Species & AMR
- REIMS mass spectrometry
- Collaboration with Imperial College



Antibiotic discovery

- Collaboration with Royal Botanic Gardens Kew
 - Prof Monique Symmonds
- Intelligent selection of plant extracts
- Focus on
 - novel mechanisms of action
 - Screening for innate immune effects

University of Cambridge

- Cambridge Infectious Diseases Consortium
 - Interdisciplinary Research Centre
 - www.infectiousdisease.cam.ac.uk
- Cambridge Global Food Security
 - www.globalfood.cam.ac.uk
- Strong links with Wellcome Trust Sanger Institute

issues/challenges/solutions

- Evidence to support decision making
 - Quantifying risk of antibiotic use and presence of AMR on farms/environment to human health
- Effective monitoring and surveillance
 - *Sustainable and cost effective*
 - Reference data for comparison/analysis
 - sequence data & isolate collections with good meta-data
 - disease prevalence
 - antibiotic use