CONNECTED Africa Launch Conference in Uganda

The research question setting workshop during the Africa Launch Conference in Uganda in May 2018 augmented and refined the findings of the UK workshop in January 2018, providing useful insight from researchers across Africa. CONNECTED are using these workshop outputs to refine both its niche and action plan, and the strategic priorities of the second pump-prime funding call.

Delegates were then asked to revisit the research question setting workshop outputs following an interdisciplinary working exercise. This provided different and additional perspectives on the initial results.

Summary of outputs

- Outputs gathered at the UK conference were generally agreed with and enriched with additional points and insight from researchers across Africa
- No new overall priority areas were identified so the original five areas were retained.
- Africa-based delegates said that the barriers across all five strategic priority areas that UK delegates identified still hold.
- Field epidemiology still has a lot of knowledge gaps: challenges in reproducing lab experiments/data in the field
- Any solution has to be SUSTAINABLE; farmers need to be willing to pay for new solutions for continuity when funding ends
- There are several areas where a unified/standardised approach across Africa is required

Points from each priority area

Control strategies

- Agreed with UK launch findings
- No advocacy for chemical use because of non-judicious use. Non-chemical methods; locally made botanicals and detergents
- Study alternative pest hosts
- Host plant resistance – explore different resistance models
- Biological control; entomopathogens, parasitoids massive release
- Early warning systems for vector and disease outbreaks e.g. smart phone applications

Most important points:	Community-based campaigns to reduce vector and VBDs
	Policy on regulation of movement of planting materials
Unknowns/challenges	Pest resistance to pesticides
	Acceptance of GMOs in control of vectors and VBDs

Barriers

- Limited disease and pest management technology to meet the demand of SSA's diverse ecological areas
- Need a demand driven approach strategy by famers and various stakeholders
- Lack of interconnected disciplines to develop technologies/products that benefit farmers
- Need for risk assessments to be done before an outbreak occurs.

Additions following interdisciplinary exercise:

- Breeders for development of new resistance vector varieties of crops
- Modelling virus and vector spread

- Additional disciplines under control strategies: social scientists; extensions

Vector biology

- Diagnostics
    - Biotypes/cryptic species identification
    - Research and future tools for extension
- How plant diversity affects these interactions
    - Reservoirs: vector influence on density; effects on vector population growth
    - Alternate vector
- Chemical ecology and volatiles/non-volatiles (plant defence)
- Biology/ecology of vector biotypes – host relationships and adaptation
    - How are the biotypes distributed within and among the populations?
- New vectors of the same virus
- Co-evolution driven by virus interactions

Additions following interdisciplinary exercise:

- Vector biology: look at all vectors of viruses, i.e. nematodes and others, not just insects
- Neglected crops

New diseases

Challenges

- Diagnosing new diseases: infrastructure – reagents and equipment, capacity, finance. Delays in procurement can be very lengthy. Identification: new disease or not? What tools can be used?
- Adoption – users, scientists, funding. Lack of a central database for surveillance and information
- Results communication nationally/internationally: to policy makers, scientists, farmers. Across borders
- Warning systems cross-borders regionally
    - Strengthening national systems (warning and early response)
    - Involvement of phytosanitary skills. Public awareness of moving plant material for NGOs, traders, extension workers

Additions following interdisciplinary exercise:

- Breeders for development of disease resistant plants/varieties

Virus-vector interactions

- Feedback from the UK launch: how do we prioritise?
- Collaboration: Sharing material for continuity, startups. Disciplines: entomologists, virologists, genomicists, bioinformatics
- Barriers/challenges: Conflicts of interest; quarantine regulations/policies
- Priority: chose a vector that transmits most viruses.
- What are the virus determinants of transmission, and making links between biology of insects and their ability to transmit viruses
- Insect rearing methods
- Having a standardised transmission assay with a reference susceptible plant
- Confirm vector of each virus
- Potential of transmission of different virus strains/species by different whitefly species

- Vector competence/unknown vectors?
    - Many whitefly, virus species: which whitefly species transmits which viral strain?
    - Higher whitefly population correlated to higher disease incidence but trend has changed. Why?
    - Do we have other (novel) vectors?
- Maintaining representative and specific vector cultures
- Co-evolution and adaptation of viruses and vectors
- How plant virus resistance mechanisms/phenotype influence vector behaviour/transmission
- Vector feeding points vs. viral distribution in the plant
- Vector population dynamics and implications for virus spread/environment
- Effect of virus on vector fitness
- Integrated sequences

Additions following interdisciplinary exercise:

- Functional basis of vector competence

Diagnostics, surveillance, and forecasting

- New low cost quick in-field diagnostics tools
- Forecast models need to be developed for insect vectors
- Need for pest risk analysis
- Need specialists and not farmers to identify pests and diseases
- Need for harmonised diagnostic protocols for Africa

Challenges

- Viruses cause similar symptoms
- Availability of diagnostic kits/reagents
- Sample storage during/after surveys
- Lack of central place for reporting
- Lack of regional/national rapid response units
- Lack of regional ring tests (credibility)
- Need for database for viruses affecting plants in Africa and reference materials
- Need for regular surveillance and need for better systems/tools for surveillance
- On-farm detection – need to be done like using micro-chip, LAMP
- Capacity building is important
- Interpreting NGS findings needs to be done well to give good conclusions

Most important point: Funding limitation for surveillance and forecasting

Missing from UK findings: Bioinformatics (training, collaborations, facilities)

Additions following interdisciplinary exercise:

- Economist for use of diagnostics
- Remote imagery for disease surveillance and identification of virus
- Agricultural extension
- GIS specialist to help in mapping
- Bioinformaticians
- Social-economics