Western Cape Government
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Veterinary Services
Animal Health

EPIDEMIOLOGY REPORT 2012

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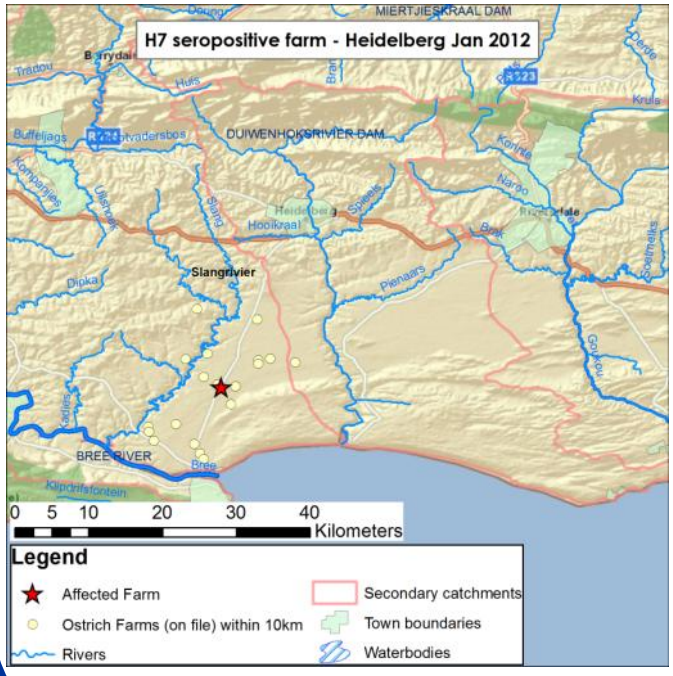
H7 Avian Influenza - Heidelberg

INTRODUCTION

An export registered ostrich farm in the Heidelberg district tested positive to H7 (likely H7N1) avian influenza during routine pre-slaughter testing in the beginning of Jan 2012. As per requirements 30 serum samples had been taken from slaughter bird stock and 30 samples had been taken from a chick flock, this to attempt to cover age-associated epidemiological groups on the farm. The serum from the chick group showed 14/30 positive reactions on the ELISA, and after using the HI assay 9 were positive against the H7N1 antigen and 6 were positive (at lower titre levels) to the H7N4 antigen. (*Note: It was comforting to see that there were no positive HI results with corresponding negative ELISA results, and although the opposite was not true this is how a screening test (the ELISA) should behave)* Based on the serology results and the difference in titres and positives between the H7N1 and the H7N4 antigens it is likely that the virus involved is H7N1.

CONTROL AND REPORTING

All ostrich farms within 10 kilometres of the affected property were identified and were quarantined along with the affected property. These farms will be sampled for virus detection both serologically and using PCR on tracheal swabs. The farmer has 5 sections of land on which he runs his production system, and three of these were deemed interconnected to such an extent that they are considered one property. The reporting of the incident was done via a standard SR1 form to DAFF who further reported it to the OIE. (*Eds note: The OIE reporting system allows reporting as Low Path Avian Influenza or High Path AI and it seems as if, when no distinction is made during reporting, the default is high path AI until shown otherwise. It is for this reason that the OIE report for this event (http://web.oie.int/wahis/public.php?page=single_report&pop=1&reportid=11551) was indicated as high path avian influenza even though the diagnosis was made on serology which cannot differentiate the pathogenicity.)*



TRACING AND BIOSECURITY

This farm is a closed unit in terms of production, with production starting with breeder birds, onto egg collection and incubation and ending with slaughter of young adult birds for meat for export under normal conditions. Movements to and from this farm (other than for slaughter purposes) have occurred on average 1-5 times a year for the past few years. The most recent movements to the farm were from a farm in the Eastern Cape in June and August 2011 where 114 older chicks were moved on both occasions. Prior movements in 2011 occurred in March. Eastern Cape State colleagues were informed of the trace back farm and reported that multiple sampling had occurred on the farm since the last movement with negative results. The type of production system along with the lack of birds (potentially infected) entering the system makes it unlikely that introduction via infected birds would have played a role in introducing the virus to the farm.

The one concerning aspect, pertaining to biosecurity (which is mostly logistically and practically unavoidable) was the movement onto and access of staff and vehicles to the affected farm. The farm has multiple access points from more than one public road, and this seems like the norm in this part of the Cape. There are permanent staff on the farm while other staff arrive on Monday mornings and leave the farm on Friday afternoons, and then some staff arrive and leave on a daily basis. This means that the movement of vehicles and people onto the farm is difficult to control and in general poses a biosecurity hazard from a disease introduction point of view as there are diseases like avian influenza and Newcastle disease which can travel on fomites.

Clinical Signs of Avian Influenza

The older chicks from the initial seropositive group were anorexic in the beginning of January 2012 just prior to sampling. There were however a few factors which may have precipitated this. The weather at that time was extremely warm and windy and caused a general decrease in habitus of the birds. There had also been a change of pellet size and content prior to the general anorexia. Furthermore, the appetite improved significantly after the farmer dosed the birds with anti-helminthics. Avian influenza may have been a cause of the anorexia but its subjectively more likely that it was one or a combination of the factors described above.

Follow-up sampling amongst other groups on the farm have been largely negative with an extremely low H7 sero-prevalence result from slaughter age birds. Clinical signs of avian influenza amongst these groups of birds were non-existent at the time of our investigation.

Water and water sources

The water for the farming and for human consumption is sourced from the scheme water for that area and, according to the farmer, originates from the Ertjiesvlei' dam. An attempt was made to identify this dam and it is likely to be the Duiwenhoksrivier dam (see map on page 1). Chlorination of water supplied to the chicks has been performed for the past seven years on this farm, and chlorination of water for the rest of the production cycle was being implemented at the time of the visit.

The farm and surrounding areas are very flat in that region, and there are pans which exist and fill up in winter with water while in summer they are dry salt pans, hence the name for one of the sections: - Soutpan. The farmer has fenced off the pans in his ostrich camps and ostriches do not have access to open water. The farmer also does not irrigate crops or pastures.

Wild birds

This area is historically rich in wild bird populations, particularly when there are crops and water for them to feed off. Egyptian geese are commonly sighted and although they are not moulting on the farm the farmer mentioned that the 'Ertjiesvlei' dam contains many Egyptian geese during moulting season, which would be occurring during summer in that region. There are, however, individual pairs of Egyptian geese which consume feed and water from ostrich camps in summer. Other commonly seen wild birds in the area consist of blue cranes and ibis species, and migratory storks are also seen, often in the month of December.

Plan of action of Veterinary Services of the Western Cape

Apart from sampling farms with ostriches on them with 10 km of the affected farms the Department has also re-sampled the specific group of chicks which tested seropositive - sampling was for PCR and no virus could be detected (matrix gene). There is also the worker's community at Slangrivier (see map on Page 1) which apparently contains a healthy (size wise) population of backyard chickens. Animal health technicians will attempt to sample these properties as well, this will serve as both a trace back and potential trace forward investigation.

Preliminary Conclusions

The initial seropositive results are very indicative of an H7 sero-reaction in the chick group. At what stage this occurred is difficult to determine as PCR results have proved negative. Basic risk factors for the introduction of AI onto this farm include farm labour and vehicle access as well as a wild bird component, although this is more likely a larger factor in winter. Water borne virus is a possibility, particularly with the likelihood of moulting sites of Egyptian geese toward to source. This will be clarified from the sampling in the 10 km buffer area as these farms also use this water. It must also be borne in mind that this water is sanitised for human consumption.

Fig 2: A view of the inside of the chick rearing facility (up to 1 month of age) This is more high-tech than is seen in most chick rearing facilities within the industry

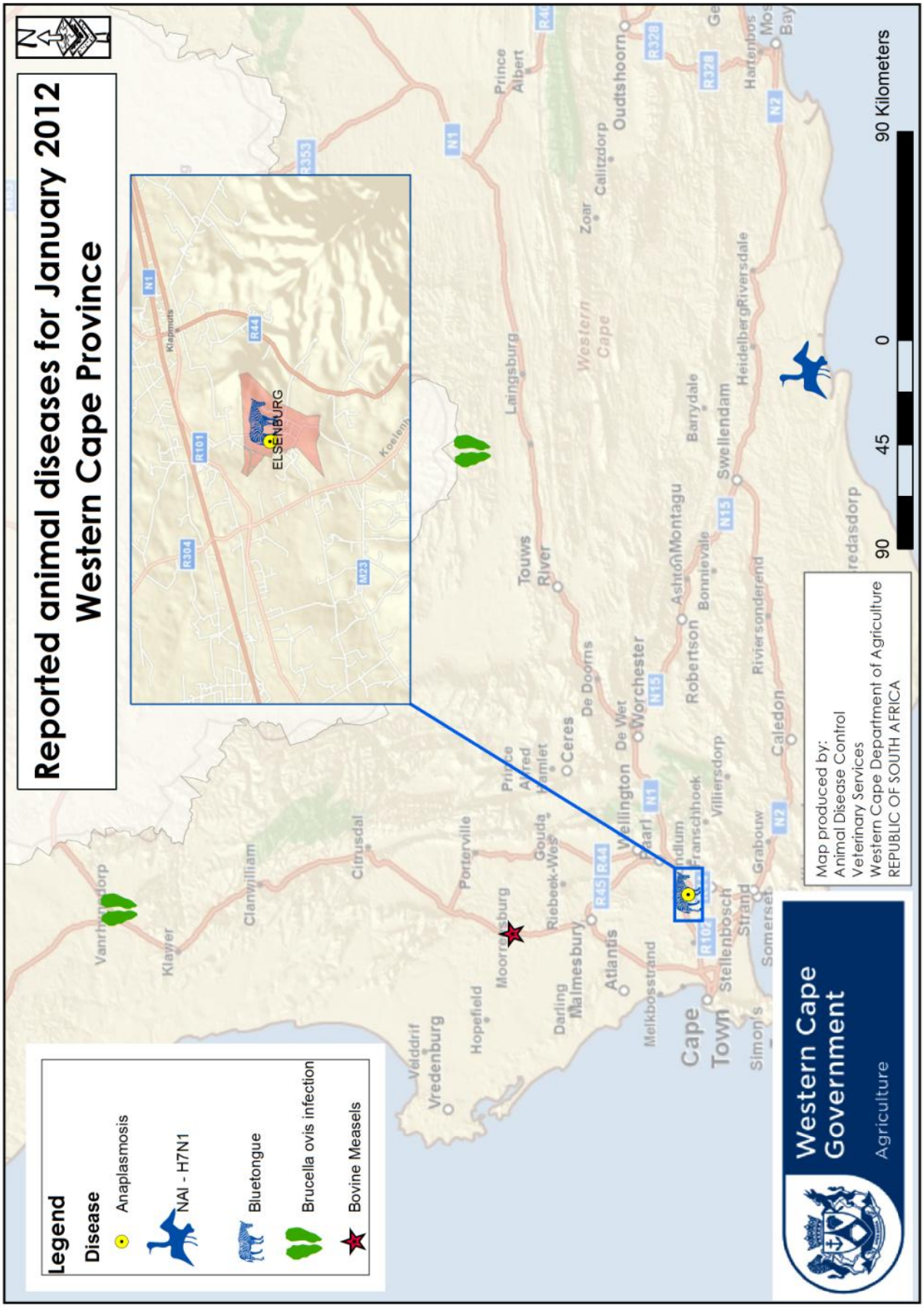
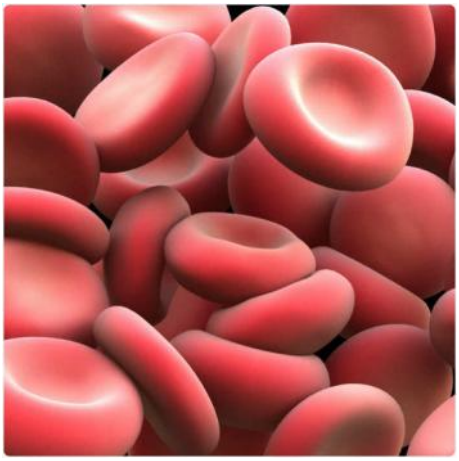


Figure 3. Disease outbreaks in the Western Cape Province identified during January 2012.

Outbreak Events



- Two more bulls at the **Elsenburg** testing station have been affected by **Anaplasmosis** since it was initially detected in November 2011. One of the bulls, despite treatment with tetracycline's, became so anaemic that a blood transfusion was performed using donor blood from an animal from the farm of origin. Subsequent to this procedure, the bull made a full recovery.

- A farm in the **Laingsburg** area tested Brucella ovis positive on serology. All positive rams were slaughtered.

- An outbreak of **bluetongue** was confirmed amongst the sheep at **Elsenburg**. Several sick animals were discovered when the sheep were brought in to be vaccinated in late December. Clinical signs seen in the affected group, which mostly consisted of young males, included pyrexia, lethargy, mouth lesions, inflamed coronary bands and lameness.

There is a nervous tension in the Malmesbury State Vet office where, for the first time in known history...well the last year or so at least...an official from another state vet area is on top of the OIE listed disease events logged table - well done Johan, you have done what many have tried, and failed, to do.

SV Area	User	Total Logs
George	Johan Botha	61
Malmesbury	Michael Chapman	60
Boland	Janica Fourie	55
Malmesbury	Esthea Jordaan	40
Malmesbury	Elmien Coetzee	29
Swellendam and Beaufort West	Magrietha van Wyk and Anton Barnard	19

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EPIDEMIOLOGY REPORT

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Dourine

Introduction & Case Description

For the first time in four years Dourine has been reported in the Western Cape Province. Our previous case occurred here in the Knysna/George area in November 2007.

The most recent case occurred in the Bredasdorp area (see the map on page 4 of this report). A private vet identified the case after blood samples were taken from a mule in late January. The mule had shown signs of ataxia and stiffness in its hindquarters and samples were also (over and above Dourine) tested against West Nile Virus and Equine Encephalosis antibodies. All three diseases came up positive on the serology tests performed, although it is not surprising that the WNV and EEV were positive as both of these diseases have a widespread seroprevalence in equines in South Africa. It is thus not possible to say which of the tested diseases (if any) was causing the clinical picture noted. The affected mule was destroyed under supervision of the private vet involved in the case.

The farm where the mule resided had only one other equid on the property, this also being a mule. These mules were used to cart between the farm and Struisbaai which is on the coast just south of the farm. The mules have been resident on the farm for the past four years and originated from the Elim community, which is a small rural community 28 km west of the farm. The farmer was not aware of any contact between his mules and other equids during the period they have been on his farm. This second mule was also sampled but Dourine results were negative.

Follow Up

In order to ensure the Elim population of equids was not the original source of the infection for the mules, officials from the Swellendam State Vet office visited the community and clinically inspected and sampled 26 equines from that area. All of these samples tested negative. The source of infection is therefore unknown in this case.

Dourine Status in South Africa and Internationally

Dourine is known to be present in South Africa (see Figure 1 below). Based on DAFF data the most severely affected Province (based on reported cases) is the Eastern Cape, which had 708 cases between 2000 and 2010. The Western Cape, Free State and Limpopo have a comparatively low reported case volume.

Internationally over the past 7 years Dourine has been reported by 10 OIE associated countries from Asia, Africa and Europe. Our nearest neighbours that have reported infection are Botswana and Namibia.

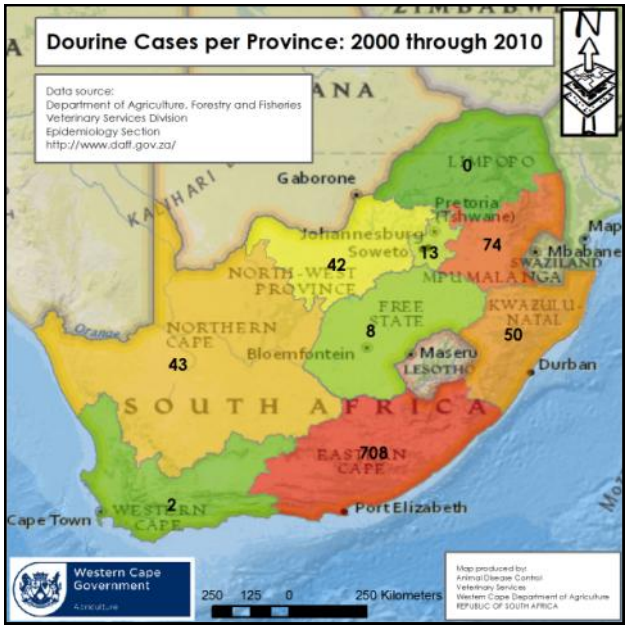

Fig 1: Dourine Cases reported to DAFF between 2000 and 2010. Case totals are shown per Province.

For more information on this disease please got to:
http://www.cfsph.iastate.edu/Factsheets/pdfs/dourine.pdf

An Introduction into Network Analysis

Introduction

Network analysis in veterinary science stems from social network analysis (SNA), which is a tool used to map and measure relationships and interactions between entities. Examples are mapping people, organisations and computers while in veterinary science it is used to map trade networks (an example would be the analysis of the network of people and/or places involved in the trade of backyard chickens).

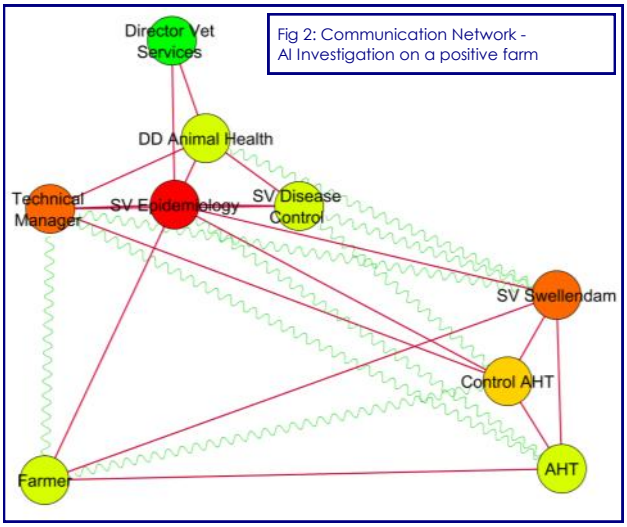

Fig 2: Communication Network - AI Investigation on a positive farm

In our current ostrich outbreak situation we are using Network Analysis to evaluate the movement of ostriches between farms in order to identify common links and also to try to associate risk levels of disease transmission to specific activities.

Example

A very basic example of network analysis (for the purpose of explanation) is shown here in Figure 2 with the network of **communication contact** between various role-players involved in investigating the AI H7 positive farm in the Heidelberg district. Note: In this case the network evaluates contact between people at its highest level where personal communication (face to face) is rated higher than telephonic communication. In this case there are three clusters identifiable viz. head office where the director and deputy director are with a number of other officials; the Swellendam State Vet office and then the farmer himself. Three common parameters are evaluated when analysing a network and they are called centrality measures - *Degree Centrality*, *Betweenness Centrality* and *Closeness Centrality*. The measures for this example have been calculated and are shown in Table 1.

Designation	Betweenness	Closeness	Degree
Director Vet Services	0.00	0.57	2
DD Animal Health	0.05	0.73	5
SV Swellendam	0.05	0.89	7
SV Epidemiology	0.21	1.00	8
SV Disease Control	0.01	0.73	5
Technical Manager	0.05	0.89	7
Control AHT	0.02	0.80	6
AHT	0.00	0.73	5
Farmer	0.00	0.73	5

Table 1: Communication Network - Parameters

Degree Centrality

Degree centrality measures the number of direct connections a node has. In this case the SV Epidemiology Node had the highest number of connections (8 in total) and this is not surprising as he had made personal visits regarding this outbreak to all members in all clusters except for the AHT whom he was in contact with only telephonically.

Betweenness Centrality

Betweenness essentially measures the influence over the flow of information in a network. In this example the node most influencing flow is the SV Epidemiology but this is not because that node has the highest degree. In networks where there are fewer links between clusters the node which has the most influence over whether information can flow between clusters holds the highest betweenness influence.

Closeness Centrality

Closeness centrality has nothing to do with the number of connections a node has, but rather with how quickly (using as few 'jumps') as possible they can connect to the rest of the network. In this case the SV Swellendam and the Technical manager have been allocated a high closeness centrality because they have access in one jump to the DD Animal Health, the AHT and Control AHT in Swellendam and

An Introduction into Network Analysis...cont

the farmer. The SV Disease Control in this case has a lower score than the two nodes mentioned above as this node had no direct contact with the farmer during this investigation.

Conclusion and Discussion

This example although simple was the reality in this specific outbreak investigation. It is easily seen that the high level of interconnection between the role-players (nodes) allows information to flow easily. The one aspect which is not ideal in this situation is that many nodes are gathering information from many different sources. In reality when an investigation is underway the investigating authority (in this case the State) needs to communicate one message between the nodes. If the farmer is contacting multiple parts of the network (in this case 5) and the communication returning to the farmer is different from different nodes it can create confusion. To prevent this you would need one line of communication, in this case from the disease control/epidemiology SV to the SV Swellendam who then informs the Control AHT, the AHT and the Farmer. This would then significantly increase the betweenness score of the SV Swellendam, particularly if the flow of information and requests from the farmer followed the same path (just backwards). Of course a balance must be found.

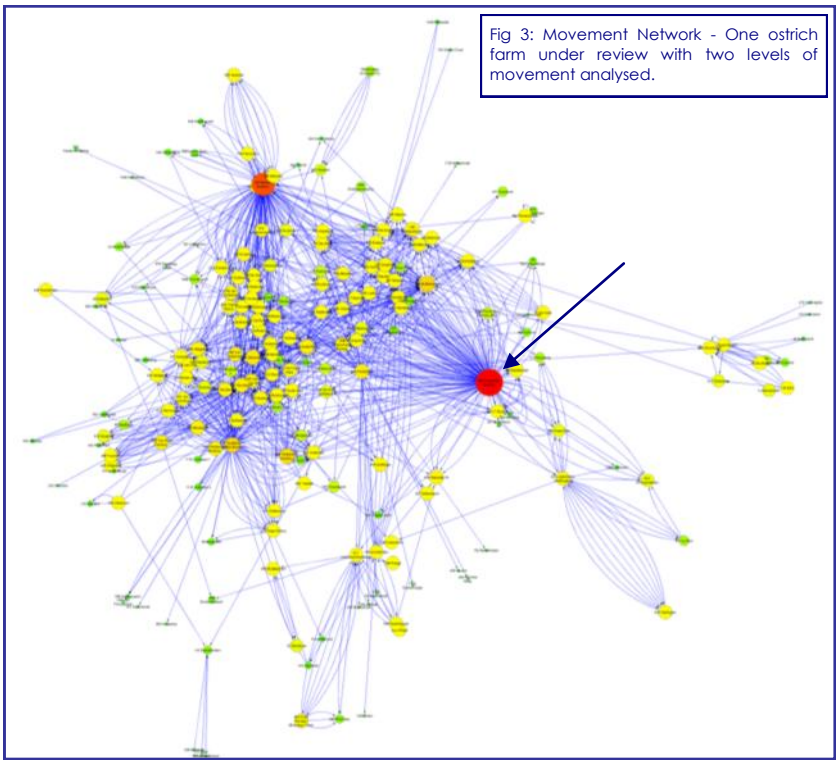

Fig 3: Movement Network - One ostrich farm under review with two levels of movement analysed.

This was a very simple illustration. In Figure 3 there is an illustration of a two-level network of movements of live ostrich product between ostrich farms between 1 Jan 2010 and 31 March 2011 (the 15 months before the HPAI outbreak was identified.) A two-level network means that the farm in question is identified and level one movements are movements between all directly connected farms to the farm in question (in this case 48 farms totalling 90 movements). Level 2 movements and farms consist of all farms then connected to the level one farms. In this case a total of 196 farms are associated in the network and constitute a total of 1053 movements. The nodes have been symbolised based on the Degree Centrality strength they have, with the large red node (see the arrow in the figure) having the biggest influence in this regard.

Using this analysis you can then give a value to the risk of transmission of disease between farms if that disease is associated with the movement of live birds or vehicles (like avian influenza or Newcastle disease). The software used also has the capability of analysing data based on the direction of information flow. (e.g. if ostriches only move away from a node and not to it - as in the case of ostrich hatcheries). You can also merge networks, so in the ostrich case if you had a network showing the movement of people between farms this could be merged with the movement of ostriches network, producing a more realistic total network.

(Note: We're really just starting on Network Analysis in our section so if anyone has any comment regarding its use please let us know.)

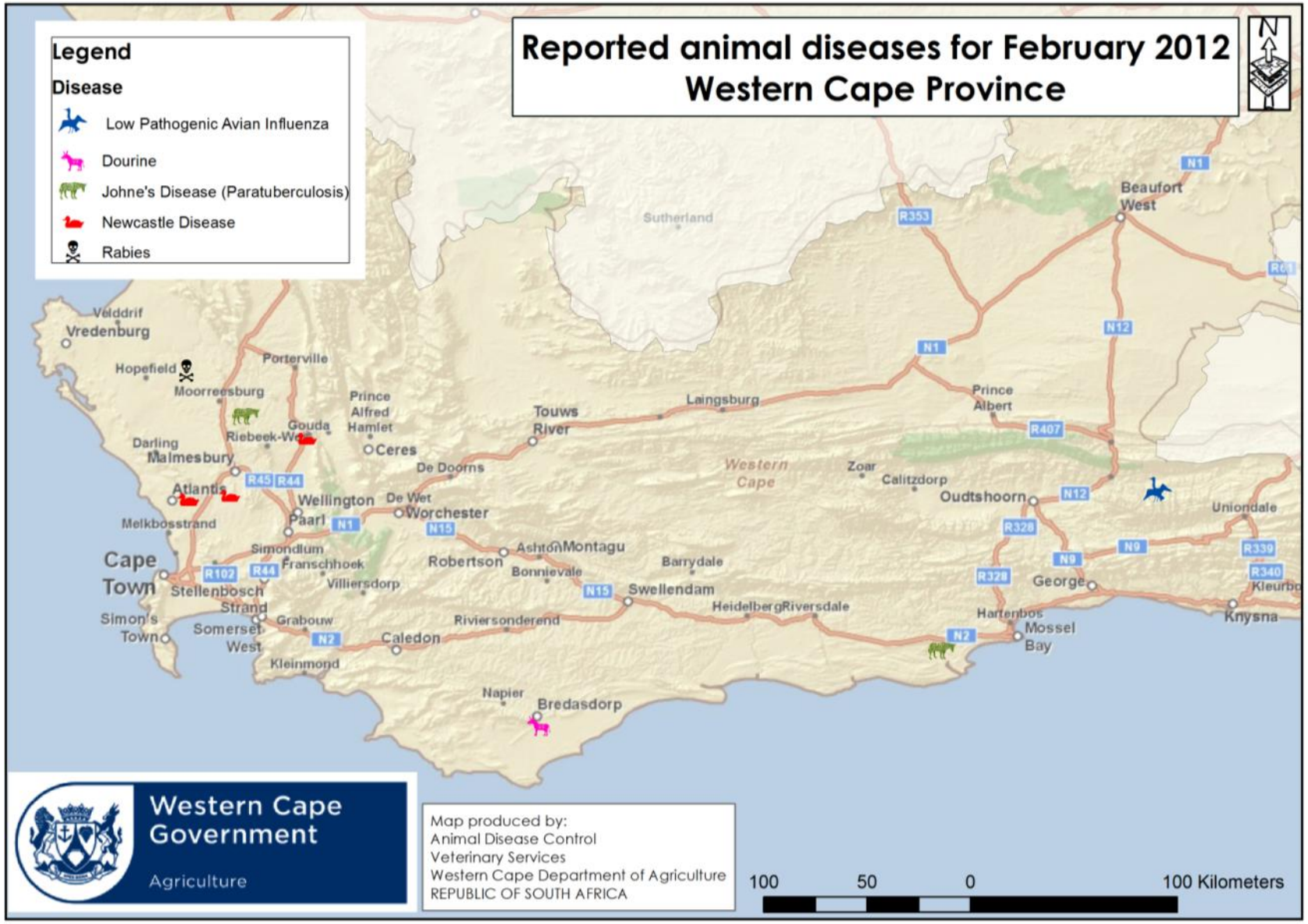

Figure 4. Disease outbreaks in the Western Cape Province identified during February 2012.

Outbreak Events

- A six-year-old pet **cat** near **Moorreesburg** was euthanased after it attacked a three-year-old child and refused to let go. A positive diagnosis of **rabies** was subsequently made. This cat had been vaccinated against rabies only once, as a kitten, and had returned home one night in mid-January with strange marks on its head and neck. Infection through a rabid wild animal seems the most likely explanation. The child has received post-exposure prophylactic treatment. The outbreak response by Malmesbury officials included vaccination of 72 domestic dogs and cats on 9 properties in the immediate vicinity.

- Four outbreaks of virulent **Newcastle disease** have occurred in the last month on poultry farms in the **Malmesbury** state vet area.

- An ostrich farm in the **Uniondale** area tested positive to **avian influenza**, type H5, during the eighth round of surveillance inside the AI control area. The virus was subsequently sequenced as a **low pathogenic H5N2**.

- Two farms have been identified as being infected with **Johne's disease**: one near **Mossel Bay** and the other in the **Moorreesburg** area. The latter farm has been losing two to three ewes per year to emaciation with bottle jaw and diarrhoea since the farmer bought in ewes from a Johne's positive farm several years ago.

Well done to all the Animal Health Technicians for logging over 500 events this month (550 to be exact). That's the second highest to date - Congratulations!

SV Area	User	Total Logs
Malmesbury	Hendrik Hagen	107
Malmesbury	Michael Chapman	83
Vredendal	Ryan Turner	48
George	Johan Botha	38
Swellendam	Magrietha van Wyk	29
Malmesbury	Esthea Jordaan	28

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Report - 8th International Symposium on Avian Influenza

John Grewar

I was fortunate to be able to attend the 8th International Symposium on Avian Influenza, hosted by the AHVLA (Animal Health and Veterinary Laboratories Agency) which was held between the 1st and the 4th of April 2012. The range of topics presented varied tremendously, with experimental research and mathematical modelling of disease balanced with outbreak investigation reports. I went with the objective of comparing the presentations given as much as possible with our situation in South Africa regarding avian influenza and how we can apply international standards and knowledge to that situation. The report below is a brief summary of some of the points that piqued my interest. Please note that they are at times subjective and are my personal opinion and interpretation of what was presented

Global reports on avian influenza

Global reports on avian influenza (AI) gave an overview of reports of AI in Europe, Africa, Asia, North America and Australia. Included in this session was a section on vaccination against H5 AI in various circumstances. This is a complex topic and it has been brought up in the current AI outbreak discussions in the Western Cape. 15 countries worldwide have used H5 AI vaccination but 99% of vaccine has been consumed by 5 specific countries viz. China, Egypt, Indonesia, Vietnam and Hong Kong SAR. Some of these countries used vaccine as they have endemic H5N1 Highly Pathogenic AI (HPAI). In all five of the countries which have used the majority of vaccine antigenic drift has occurred in field viruses resulting in protection failure. Field outbreaks have also occurred in vaccinated flocks as a result of vaccine failure or poor administration. I think it was clear that although vaccination plays a role in AI disease control it must be used with caution, and the purpose of its use must be clear.

In ostriches in RSA vaccination wouldn't be effective in decreasing mortality as AI in ostriches is not associated with a significant mortality, so its only logical use would be to prevent spread of pinpoint epidemics. The advantages gained through this in my opinion would be overshadowed by the disadvantages.

1. Constant and thorough vaccination would be needed. It was mentioned in one of the talks that a realistic coverage required would be in the region of 80% of susceptible birds;

2. You need a DIVA (differentiating infected from vaccinated animals) test which we don't currently have in RSA;

3. It is expensive to maintain a vaccination protocol beyond the immediate outbreak period;

4. AI is not endemic in our ostriches, and definitely not HPAI;

5. Stamping out of HPAI positive farms has proved to work in other countries which also get point introductions

I believe our efforts should remain focussed on detection of AI index farms and preventing spread of undetected disease through promotion of a good industry structure and biosecurity. In essence vaccination should be used where HPAI is endemic and it must be used to protect livelihoods of people and to improve food security. Vaccination to enable trade to occur may help in the short term but the long term consequences are significant and must be considered.

In all of the review talks there was a strong focus

on the H5N1 pandemic. Following this: the focus in general in domestic poultry was on H5 and H7 AI viruses. This is important as these are the potential subtypes which can become highly pathogenic. In RSA there has been more and more focus on non H5 and H7 subtypes, and while this is important information to have I believe more effort must be made with H5 and H7 viruses. AI of non-H5 and H7 must be noted but we must be careful to put too much control effort into these when our disease and zoonotic threat lies with H5 and H7 subtypes.

Interestingly, in North America and Canada there have been multiple subtypes detected in multiple species of birds. They also have a strong wild bird surveillance campaign in those regions. In North America AI outbreaks in domestic poultry have been linked to wild bird infections but also to the H1N1 human AI epidemic – this after contact between infected people and susceptible turkeys.

Australia has an interesting dynamic where they have low pathogenic AI (LPAI) H5 and H7 isolated in wild birds but no spill-over into their domestic poultry. They are also in close geographical proximity to Indonesia where H5N1 is endemic.

Low pathogenic avian influenza in poultry

As mentioned before when the European community talk about LPAI they are referring to H5 and H7 LPAI. The concern with LPAI H5 and H7 is that it can mutate to HPAI and it is for this reason they continue to stamp out LPAI farms if they are detected.

Phylogenetics are used extensively in the investigation of AI outbreaks in Europe, this is something that if done in RSA is retrospective and seldom is used during an outbreak to assist with decisions.
One of the focuses on LPAI research presented at the symposium was to determine:

- Whether it can be transmitted, and how this transmission is influenced between species of wild bird (duck in most experiments done)?
- What are the influencing variables in determining whether LPAI will mutate to HPAI?

These aspects were approached on a very much experimental basis. In broad terms with regard to inter species transmission of LPAI: it is something that does happen but you need ideal conditions for it to occur, and once the virus has changed species there is a period of adaption within the new host species which means that for every jump it's not definite that the virus will adapt to the new host.

Surveillance for AI in poultry

The interesting points made in these sessions was that there has been a move from passive surveillance of AI to a more active risk based surveillance in the past few years, particularly since LPAI H5 and H7 became notifiable in the EU. Syndromic surveillance is also something that can only be performed in clinically susceptible animals, and this is where we struggle with AI surveillance in ostriches. We have seen in our current outbreak that an HPAI virus can spread and replicate in ostriches without displaying any overt clinical signs, which decreases the success of using syndromic surveillance. In chickens syndromic surveillance can be applied, and is in SA. This only works because of the fact that chickens will most likely be affected clinically even with a LPAI (any serotype) and almost certainly with a HPAI virus. A point was made in one of the talks that different serological 'pictures' are seen with different strains of the same virus, and this I think is applicable to the ostrich situation as we have definitely seen variation in the serology on different farms during our outbreak.

A talk on the Chinese HPAI H5N1 situation also showed how they were using social network analysis to evaluate their live market system and how this assisted in risk mitigation. One of the talks regarding the epidemiology of the HPAI H5N1 viruses in Vietnam really showed how different mutations of the same virus seems to find different environmental conditions more suitable to sustained circulation. They have seen in that country how the north and south areas have these distinctive clades of H5N1 HPAI within them.

An overview of the EU serological surveillance results over the past few years was interesting, again showing the change from passive to risk based surveillance. One interesting point made in this talk was how the difference in host species and/or production type influenced the H type of virus detected most often (between H5 and H7). In ostriches in RSA we have subjectively seen a lot more reaction on the H5 HI test compared to the H7 test in the past few years.

Ecology of LPAI in wild birds

Wild birds shedding AIV will contaminate their environment and although water may be contaminated sediment is really where the virus would be focussed.

A model in Spain with regards to environmental/ecological factors associated with LPAI showed that space and time was the largest determinant of AI prevalence variation, followed by meteorological factors and then only by wild bird and vegetation factors.

Again it was mentioned that LPAI will replicate in the intestinal tract of birds. The interesting thing we have found in ostriches is that, on one confirmed LPAI farm, samples were positive from tracheal swabs, which seem to suggest replication in the respiratory tract for that LPAI virus.

Preening ducks can harbour AIV on their feathers and can play a role in dissemination of the virus via this route.

Pathobiology in poultry

With regards to HPAI H5N1 in poultry the session indicated that the pathogenicity of HPAI H5N1 is not a straightforward variable for this strain, but depends on age and species of the host. We have seen this in RSA with the H5N2 HPAI in ostriches where the pathogenicity in ostriches, if measured using clinical signs, was low but the potential of high pathogenicity in chickens was evident based on the, albeit few, IVPI tests performed. The reason for changes in pathogenicity are complex and could not completely be linked to mutagenic changes in specific RNA segments like the HA, NA or NS segments.

Field epidemiology

There was a really interesting talk on the Netherlands outbreak of H7N7 HPAI in their poultry in 2003. Again it showed the use of phylogenetics in assessing the outbreak – here they used it to show the geographical spread of the viruses. What was interesting is that the rate of virus mutation is rapid. This is a concern for us in SA as the introduction to detection time of AI in ostriches can be long (lack of clinical signs, lower replication rates within birds) and the virus can mutate in this time period. Obviously though the rate of mutation may be different in different species and the Dutch outbreak was in chickens. Their outbreak seemed to originate after a LPAI infection mutated to HPAI in the months before the outbreak was detected. Another interesting thing they did was to look at the phylogenetics of the human cases in that outbreak and how the human hosts seemed to be dead-end hosts for virus spread and mutation, which is comforting.

This outbreak really also illustrates the extent of investigation that developed countries can do. In their case they had virus sequence data from 72% of the 188 infected farms, in our current ostrich outbreak we are well below this figure.

Field control

A good overview was given with regards to control of AI practically. In essence, irrespective of what control measures are in place 3 factors influence it tremendously:

- What is the nature of the poultry industry in question, and in RSA we have seen that structural changes must be made to the ostrich industry for it to be sustainable.
- Quality of veterinary services (both private and state) – an understaffed and/or under-qualified veterinary services will be detrimental to the best proposed control strategy
- Level of commitment to control – if this is not at a significant level then control will be impossible.

I would like to thank my Programme manager and the Department of Agriculture Western Cape for the opportunity to attend this Symposium

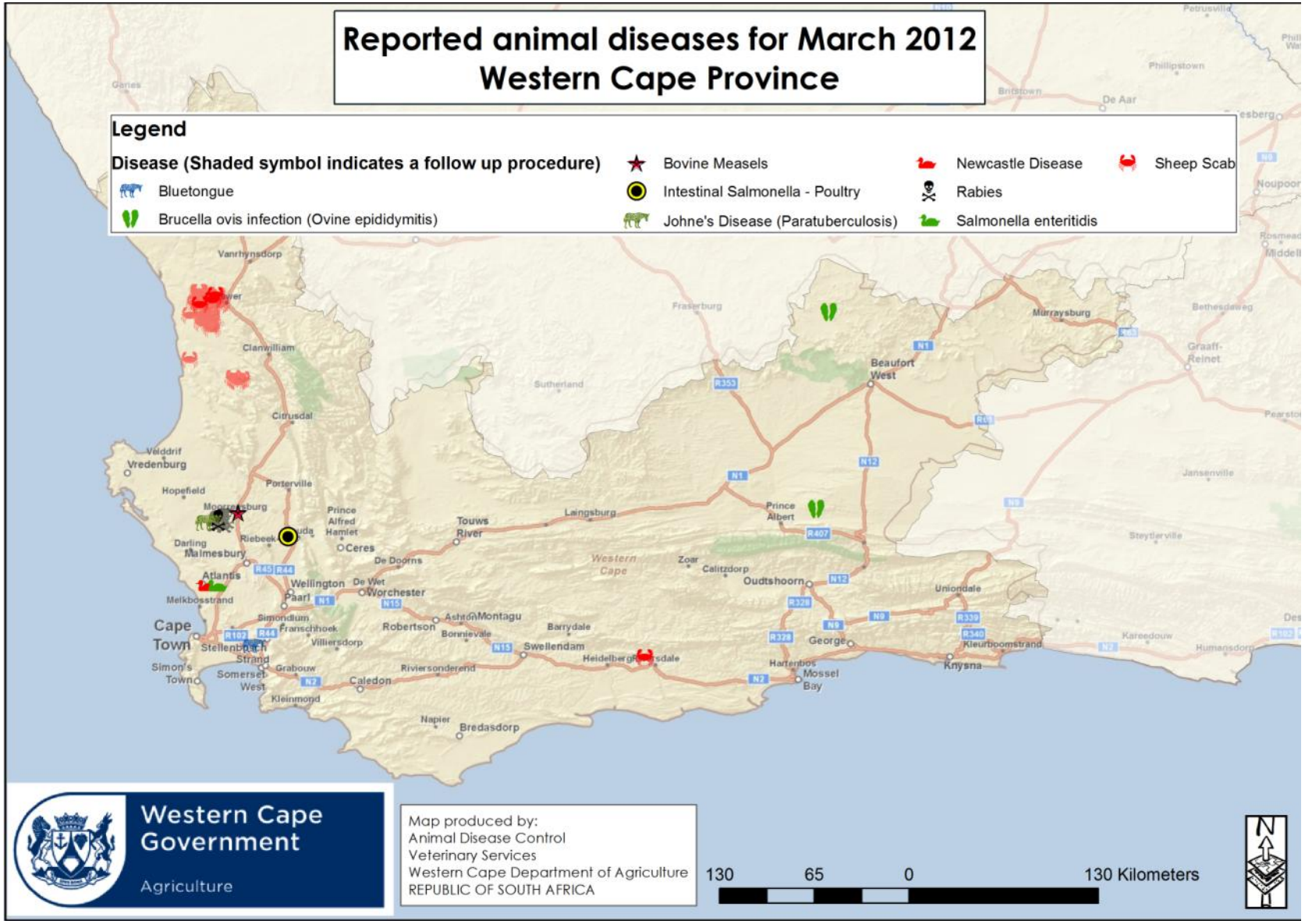

Figure 4. Disease outbreaks in the Western Cape Province identified during March 2012.

Outbreak Events

- A resident of **Paarl** telephoned the **Boland** SV office to report a suspected incident of **rabies**. In the late evening, he spotted a striped **polecat** (*Ictonyx striatus*) trying to climb his garden fence and attack his two dogs. The polecat was subsequently killed by the dogs. AHT Paarl collected the carcass and rabies test results are pending.

- A farmer from the **Moorreesburg** area found a dead **Cape Fox** in his garden that had probably been killed by his pet Boerboel. The brain of the animal was submitted to Allerton Laboratory and **rabies** was confirmed. The Boerboel had no signs that it had been bitten and the dog had been frequently vaccinated against rabies. Follow up vaccination on farms in the immediate area were performed as can be seen on the map on the previous page.

- **Vredendal** State Vet office went on a campaign against **sheep scab** after a number of farms were diagnosed with the scourge in their region. As you can see on the previous page multiple flocks were treated that were infected with the mite as well as in contact farms. In total 22 777 treatments were performed at approximately 58 different geographical locations.

- **Newcastle Disease** was identified in chickens in the **Malmesbury** district. One case originally began in Feb 2012 and is not shown on the map on the previous page. It occurred in a flock of **layers** which had only been vaccinated once as day old chicks. There was a mortality rate of approximately 16% and the farmer has been instructed to vaccinate the flock while the flock has also been quarantined. Another event occurred in the **Klein Dassenberg** region in a **broiler** farm. The farm had been experiencing increases in mortality in multiple houses of between 7 and 16% above the baseline and by the time the diagnosis had been made all poultry on the farm had been slaughtered out with post slaughter cleaning and disinfection of the houses. ***S. enteritidis*** was interestingly enough diagnosed from environmental samples taken from the farm during the initial sampling.

- **Brucella ovis** was confirmed on serology on two farms in the **Beaufort West** and **Prince Albert** regions. In total all tenrams testing positive were culled on the respective farms.

SV Area	User	Total Logs
Malmesbury	Michael Chapman	78
Malmesbury	Esthea Jordaan	50
Malmesbury	Hendrik Hagen	46
Vredendal	Jacques Kotze	38
Beaufort West	Anton Barnard	31
Vredendal	Ryan Turner	22

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EPIDEMIOLOGY REPORT

VETERINARY SERVICES
April 2012
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Surveillance Report - summary of the fiscal year ('11/'12) surveillance of CSF and PRRS in pigs and AI in ostriches

L Govender and J Grewar

The Western Cape Veterinary Services are involved in a number of formal surveillance programs for a variety of diseases. Three of our long standing surveillance programs target CSF and PRRS in pigs and avian influenza in ostriches. Both CSF and PRRS have occurred in the Western Cape within the past few years and this surveillance was instituted by National Government in order to ensure that the area remained free of these two diseases. The avian influenza surveillance also occurred as a result of an incursion of a HPAI virus and surveillance has continued over the past few years which not only allows us to remain confident that we can detect outbreaks of the disease but also to allow the export of ostrich products to trading partners during periods of AI freedom. This report (and the map on the following page) gives an overview of what has been accomplished in terms of cover-age during the last fiscal year (1 Apr 2011 - 31 March 2012)

CSF in pigs

A total of 441 farm visits were performed by State officials with 4029 serum samples taken for CSF testing. 352 individual farms were sampled during this period. 5 individual farms had positive or suspect results. In all cases these were at low sero-prevalences and farms were re-visited and sampled with clinical examinations being performed by State officials. The State vet areas where these results were obtained were SV Malmesbury (n=3), SV Swellendam (n=1) and SV Boland (n=1) In all cases follow up investigations showed that the results were false positive and no evidence of disease was found.

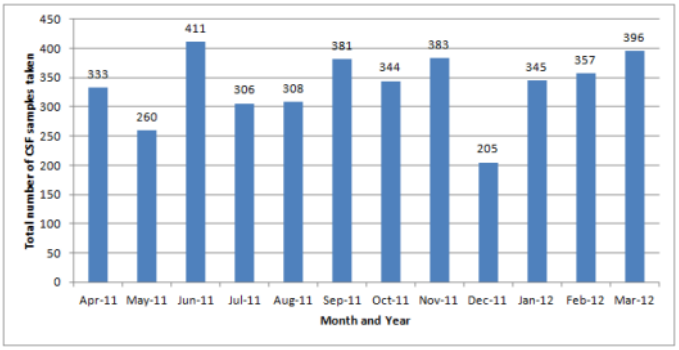


Fig 1: Period of year during which samples taken for CSF testing were taken

Fig 1 shows the time of year during which the 4029 samples were taken, and it is clear that the sampling is evenly distributed throughout the year. The majority of unique farms sampled are located in the SV Malmesbury district (37%), the SV Swellendam area (26%) and the SV Boland area (24%).

PRRS in pigs

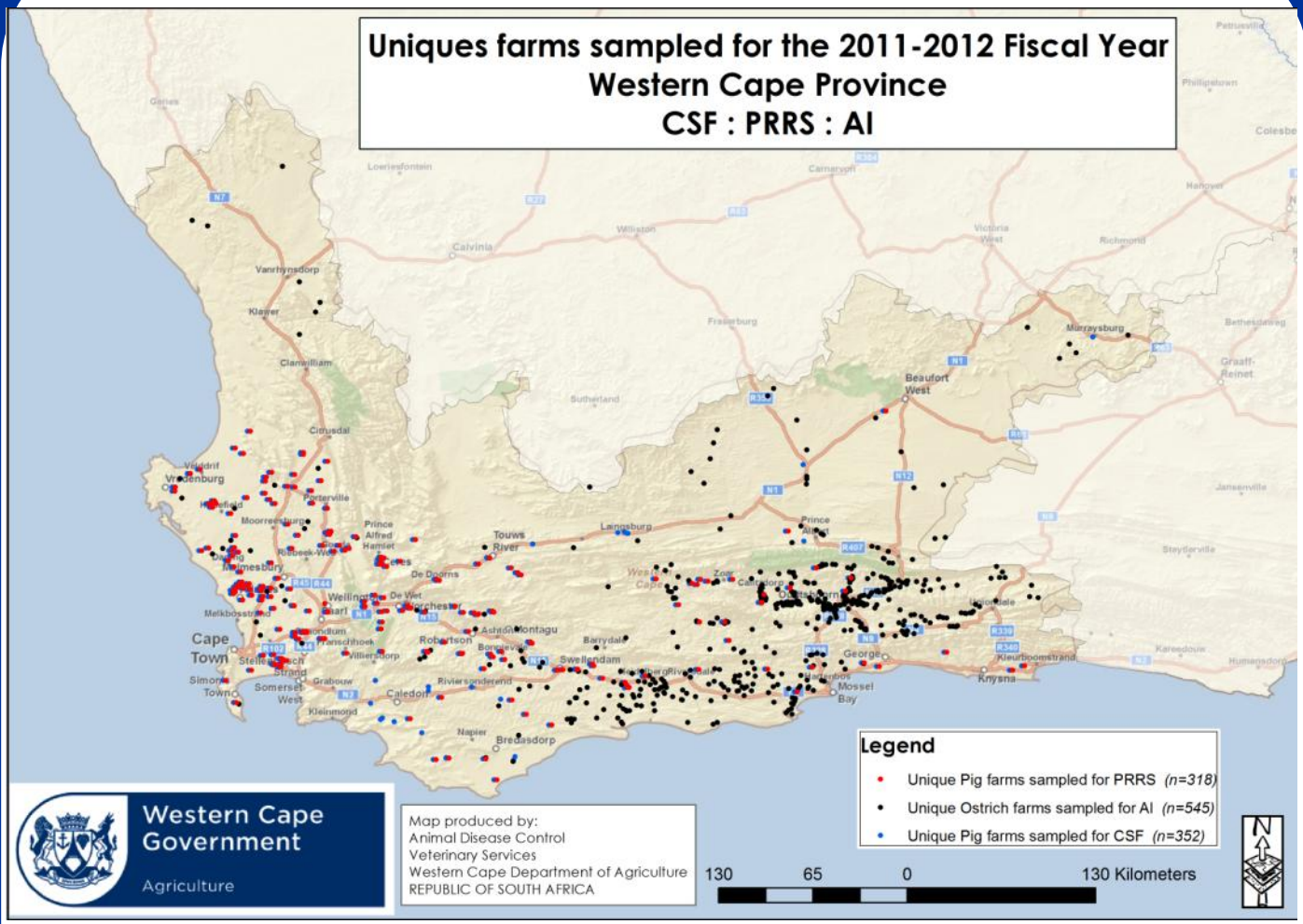
A total of 379 farm visits were performed by State officials with 3663 serum samples taken for PRRS testing. 318 individual farms were sampled during this period. 2 individual farms had positive or suspect results and were followed up as described in the CSF paragraph. These 2 events occurred in the SV Boland and SV Malmesbury areas respectively.

AI in Ostriches

Note: In the ostrich surveillance there are serum samples which are taken by non-State officials which are authorized by the State. This constitutes approximately 25% of the serum samples taken during the period under review

783 ostrich farms had census taken on them during the time period under review, of which 545 were sampled. This included sampling for

Fig 2: Unique farms sampled for Avian Influenza (Ostriches), CSF and PRRS



slaughter, movement and/or as a result of the AI 2011 outbreak - the majority being the latter. The total number of sampling events totalled 2 969 which averages out at almost five and a half sampling events per unique farm during the year.

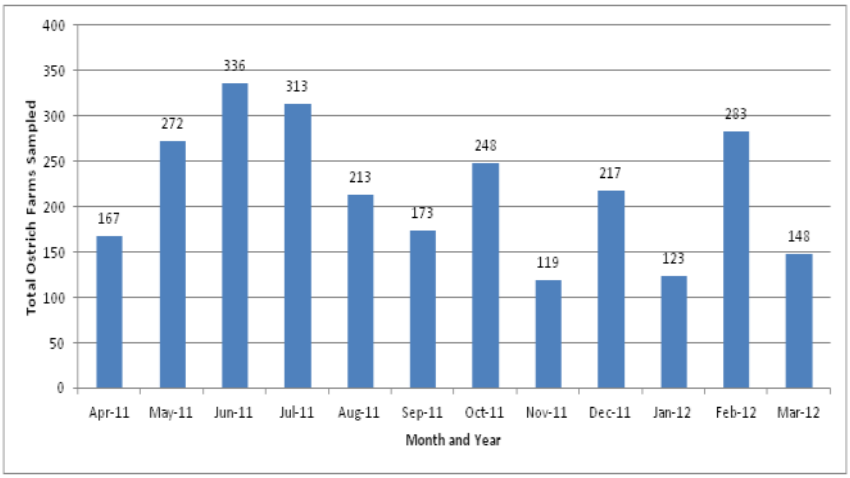


Fig 3: Period of year during which ostrich farms were sampled for AI

The majority of samples taken fell into one of 3 types: serum; tracheal swabs and cloacal swabs. A total of 110 542 serum samples , 68 561 tracheal swab and 10 188 cloacal swab samples were taken in these categories. As a result of the multiple rounds of surveillance during the outbreak the distribution of farms sampled throughout the year is reasonably evenly distributed (see Fig 3)

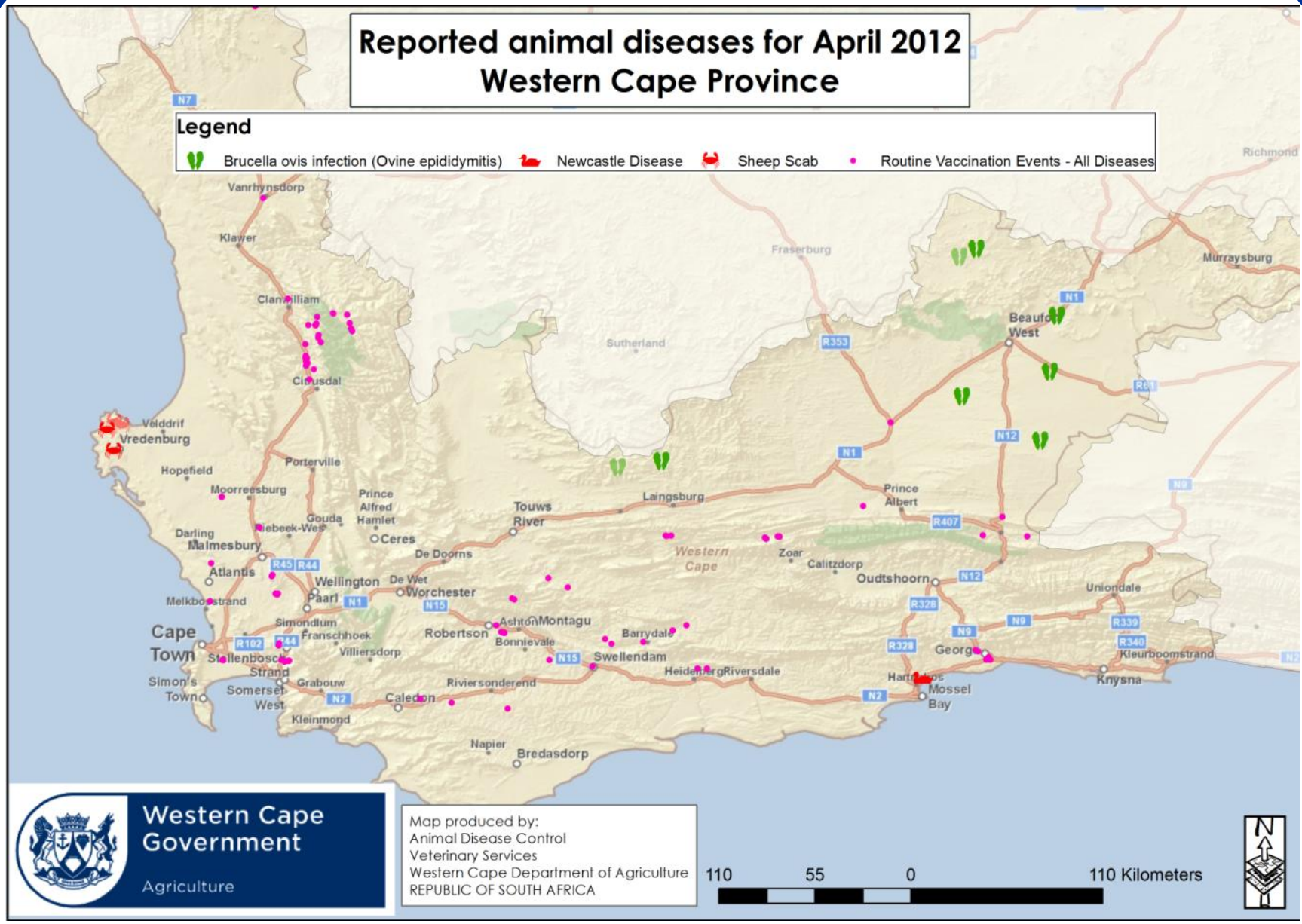


Figure 4. Disease outbreaks in the Western Cape Province identified during April 2012. Included are all the routine vaccination events (disease not specified) performed by State officials that were logged during April.

Outbreak Events

- **Sheep scab** was identified in the **Vredenburg** area. The introduction of the disease onto the farm is suspected to be via a shearing team which worked on a previously positive farm. The farm has been placed under quarantine and will be treated twice under official supervision. Interestingly the sheep were also concurrently infected with **red lice.**

- **Newcastle disease** was identified in chickens in the **George** State Vet area. The chickens were situated in an informal settlement near the Kleinbrakrivier. No vaccination of the flock had previously taken place. Eleven mortalities had taken place out of an estimated 200 susceptible birds. The diagnosis was made by the Western Cape Provincial Veterinary lab who confirmed the virulent NDV fusion gene using PCR testing. Mosstrich abattoir are assisting in the vaccination of poultry in the surrounding areas which forms part of the control measures of this outbreak.

- **Brucella ovis** was confirmed on serology on two farms in the **Beaufort West**. Both farms had identified the disease previously on their properties and were busy with further testing of rams when the positives were identified.

- *A resident of **Paarl** telephoned the **Boland** SV office to report a suspected incident of **rabies**. In the late evening, he spotted a striped **polecat** (Ictonyx striatus) trying to climb his garden fence and attack his two dogs. The polecat was subsequently killed by the dogs. AHT Paarl collected the carcass and rabies test results are pending.* - The above paragraph is what we reported on in the **March 2012 Epidemiology Report.** Results of this sample tested **negative** for **Rabies**.

Ostrich AI outbreak follow up info

- The final farm that was identified as being associated with the H5N2 HPAI outbreak will be slaughtered out within the first three weeks of May 2012. If no other identification of virus occurs between that date and the beginning of June 2012 the Western Cape Veterinary services will be in a position to request that the HPAI H5N2 outbreak be resolved based on the surveillance and control measures which have been put in place since the outbreak began over 1 year ago. This request involves discussion between the Provincial and the National Veterinary services, however it is still difficult to say when the export market may open for fresh ostrich meat as the requirements for this are negotiated between DAFF (our National Veterinary department) and the applicable trading partner.

SV Area	User	Total Logs
Vredendal	Irmi Speelman	44
Beaufort West	Nita Vosloo	18
Malmesbury	Esthea Jordaan	16
Boland	Maresa Fourie	14
George	Eddie Lottering	10
Swellendam	Wynand Fourie	9

***Note**: You may notice that the monthly logs on the OIE disease logging system decreased compared to normal. This is as a result of an upgrade of the website and we had some technical issues which have been sorted out. We expect the logs return to their normal totals from May 2012.*

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EPIDEMIOLOGY REPORT

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Census Report - a current summary of data captured on the CADIS system by technicians

Introduction

Part of the work that Veterinary Services' Animal Health Technicians do involves CADIS data. CADIS is the **C**ape **A**nimal **D**isease **I**nformation **S**ystem and it was developed to maintain animal census information on farms within the Western Cape. Animal Health technicians visit farms in their area as often as possible to maintain contact with farmers and assist them with animal health and animal production queries. They complete their CADIS forms when undertaking these visits and these data are stored on a central database at Elsenburg. We are currently in the process of upgrading CADIS to make it a web based data system for input and retrieval of basic census information. This will hopefully decrease the error rate and time taken to submit information by technicians and also, by having a system that they can retrieve information from may stimulate them to increase the frequency and dedication to the census task.

Current data set and coverage within the Province

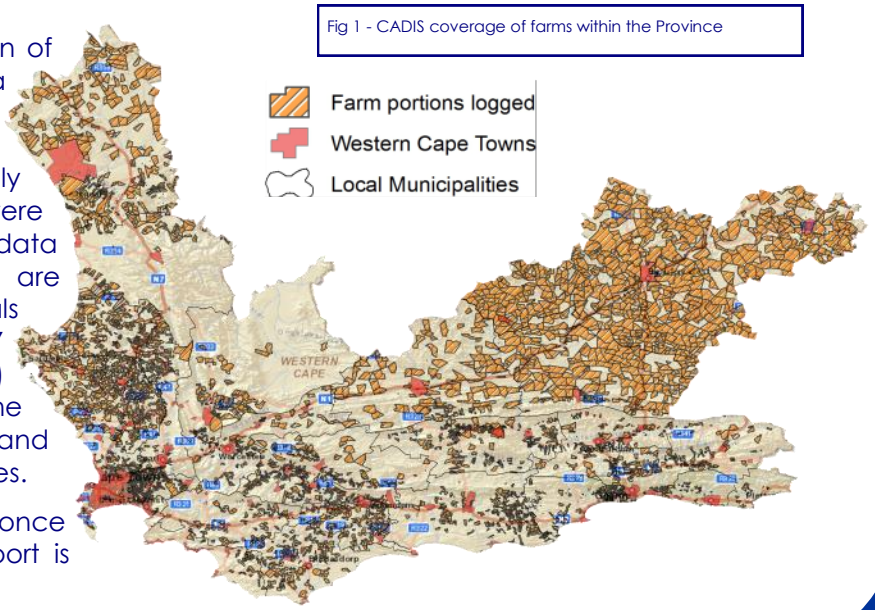
Figure 1 (below) gives an indication of the coverage of the current data on CADIS. This coverage amounts to approximately 6 700 farms and farm portions of which approximately 5 300 have had animals on that were censussed - and it is from the latter data that the maps on the next page are generated. The coverage by officials has been improving over the past 7 years (when CADIS was introduced) and as can be seen on the maps the data output is becoming more and more valuable as coverage improves.

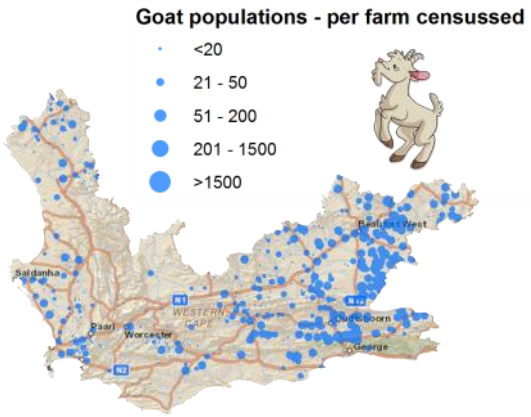
Farms are often visited more than once and the data depicted in this report is extracted from the last time a species was censussed on a particular farm. The longer the time period between when a farm was censussed and when the data is evaluated is inversely proportional to the validity of that data. As with any census data this information presented must be seen as a estimate of the actual animal figures. The data extracted for this exercise stretches over a period of 5 years with 78% of the information coming from 2008 - 2010 and 12% coming from between 2011 to date.

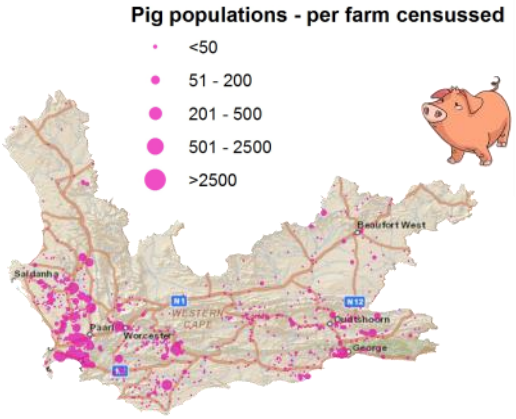
Usage

Veterinary Services makes use of census information for a variety of reasons but from the Epidemiology section's point of view the data gives an impression of host locations for specific species. This assists in planning during outbreaks, planning for potential outbreaks and planning for surveys when disease freedom or prevalence is required.

Fig 1 - CADIS coverage of farms within the Province







Goat and Pig population

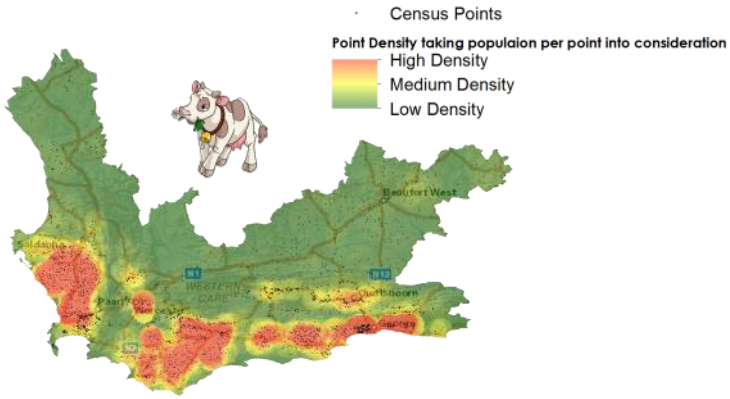
The pig and goat population did not contain enough points to do a density plot like the bovine and ovine data below. For the goat and pig data each point is depicted in size associated with the number of the respective species on the farm on the day of census. The goat data gives the impression of large relatively large number of goats occurring in the east of the Province and this will most likely be due to angora and boerbok farming in the Karoo. Of the total goats censsused 69% were angora goats and 22% were boerbokke.

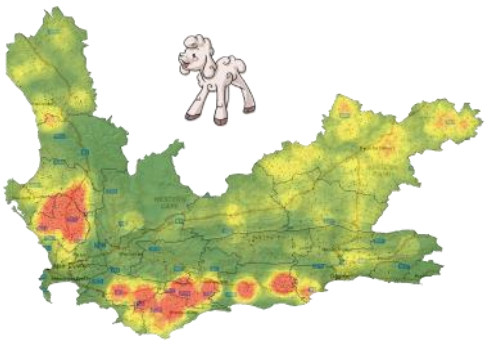
The pig population, as expected, is focussed in the more urban settings and in the Cape Town and Boland regions. Past outbreaks of PRRS and CSF in pigs originated in these focus areas which supports the targeted surveillance strategy we currently employ for showing disease freedom.

Bovine and Ovine populations

The bovine and ovine populations were thoroughly enough monitored for density maps to be made which measures the density of points that had the species on them but also accounts for the number of the animals at each point. The density is a function of population per area. In the Southern Cape and Swartland there are high densities of both cattle and sheep. The increase in density of cattle in the Eden area (George and Knysna) will be as a result of the dairy farming in that region. Note the higher density of sheep in the Karoo compared to the cattle density in the same area.

During the Rift Valley Fever outbreaks of 2010 and 2011 the virus could be seen in the higher ruminant populations and it will remain important for the southern Cape and Swartland to continue vaccinating against this disease.





Outbreak Report - Low Path Avian Influenza H7N1 - Ostriches

Introduction

Positive avian influenza (AI) serological results from 3 ostrich farms in the Albertinia region of the Southern Cape were reported after sampling was performed on all three farms on the 16 May 2012. The sampling was as a result of the pre-movement and pre-slaughter procedure which is a standard in the industry. The initial results showed AI ELISA positive prevalence's of between 10 and 30%. Samples from farm 265 (10% ELISA prevalence) were tested using the haemagglutination inhibition (HI) assay and all 3 samples tested strongly positive using the H7N1 and the H7N7 antigen with titres of 1:128. The other two farms had higher ELISA + prevalence's with 27% (farm 827) and 30% (farm 634). They both tested strongly positive on the H7N1 antigen with high titres but also had cross reactions on the H5 antigens used. This is not abnormal since the H5N1 antigen is one of the H5 antigens used in the HI test and one would expect N1 cross reactions if a H7N1 virus was present. Farm 634 however had both H5N1 and H5N2 reactions which clouded the results somewhat.

The reactions immediately flagged a response by the State services and re-sampling was planned. DAFF also became involved and requested that tracheal swabs for PCR antigen detection be taken in triplicate and sent to 3 different laboratories, namely Deltamune in Oudtshoorn, Stellenbosch Provincial Veterinary Laboratory and Onderstepoort Veterinary Institute in Pretoria.

Follow up results

Follow up results immediately indicated a circulating virus on Farm 265. This was confirmed at 2 of the 3 labs which performed the PCR testing. Unfortunately one lab reported suspected leakage of sample material during transport so results were compromised. The matrix gene reactions for farm 265 showed a prevalence of 41-46% between the labs with a H7 positive PCR result on 90-100% of the positive m-gene swab pools. PCR product was immediately sent to OVI and was sequenced as low pathogenic H7 N1 avian influenza.

The serology results from farm 265 showed a very strong ELISA (30% prevalence) response with 94% of the 36 positive sera testing positive to H7N1 on HI and 69% testing positive to H7N7 on HI. These serology results confirmed the ongoing circulation of virus identified through PCR testing.

The follow-up results from farms 634 and 827 were surprisingly negative, both on PCR and on serology. The same birds which were tested on the initial sampling subsequently tested negative on the follow-up with only 9 days elapsing between the positive and negative result. If AI was present on farms 634 and 827, and it was the same virus responsible as identified on farm 265, then one would have expected similar reactions observed on farm 265 during the more thorough follow-up sampling. Even if active virus circulation was complete in these two farms the serological titres on HI are unlikely to have naturally dropped to undetectable levels in the short period between tests. We are not sure why this positive to negative discrepancy exists. The State Vet involved in the investigation could not find any specific fault with the initial sample collection by the vaccinator or any sample mix up during processing, transport or reception at the lab that tested the samples. The cross reactions to H5 antigen on both the farms with conflicting results also decreases the value of the initial positive result.

Summary

- H7 low path AI confirmed
- 1 farm with active circulating virus
- 2 farms with conflicting serology results
- ELISA prevalence at 30% on farm level
- HI H7N1 prevalence at 28% on farm level
- Matrix gene prevalence at 41-46% on tracheal swabs with H7N1 confirmed on sequencing
- All three associated farms under quarantine

Further investigations

A farm level epidemiological investigation was instituted on all 3 farms during the initial increased follow up sampling event. Some of the pertinent points are highlighted here:

Farms 634 and 827 are, under normal circumstances, raising ostrich chicks which are sent to farm 265 for feed -lotting. During 2012 however there had been no movement between farms 827 and 265 and the sampling on the 16th May was the first test on farm 827. There were 3 movements between farm 634 and farm 265 during 2012. All three farms therefore fall into a small production cycle but during 2012 the only tracing link in 2012 exists between farm 634 and farm 265.

Neither farm 827 or 634 struck us as being classic farms associated with Avian Influenza infection. Farm 634 had very low ostrich density with farming practises that are very extensive. There would be a risk of exposure to wild birds as any farm has in the Southern Cape though. Farm 827 is a more intensive farming operation but birds are kept in enclosed environments with no access to wild birds.

Cont. on page 4

Outbreak Map

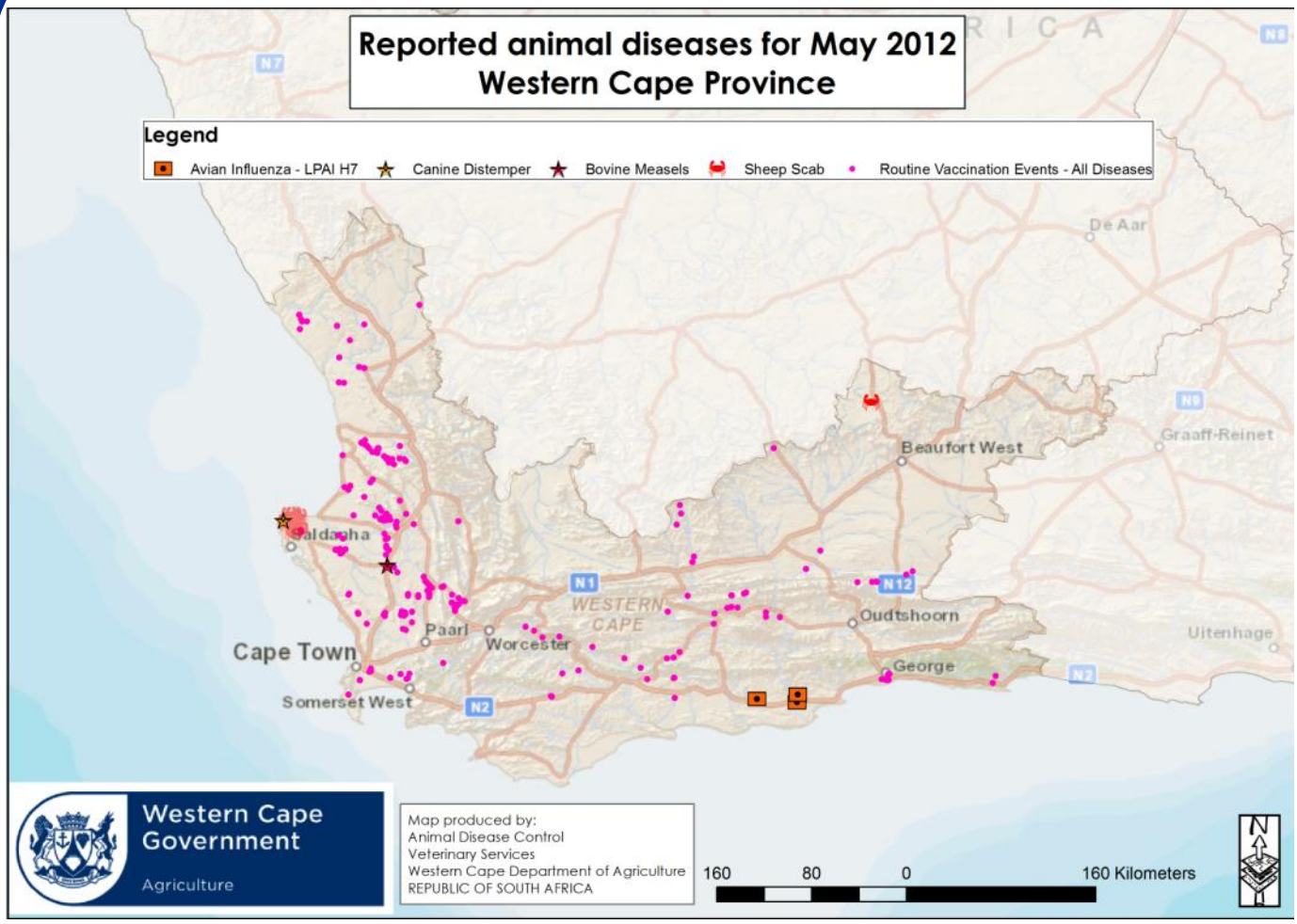


Figure 2. Disease outbreaks in the Western Cape Province identified during May 2012. Included are all the routine vaccination events (disease not specified) performed by State officials that were logged during May.

Continued from page 3

Control measures

All three farms associated in this outbreak have been quarantined. Surveillance has begun in the 10 km zone surrounding farm 265 while farms 634 and 827 remain under observation with further testing planned to establish their status. At this point we are not very concerned that these two farms are a risk for spreading any infection. Farm 265 does however pose a risk to spread of infection to surrounding farms. We are in discussion with DAFF with regards to their policy for control on this farm. In 2012 thus far three low pathogenic avian influenza farms have had slaughter out policies instituted on them.

The NICD (National Institute for Communicable Diseases) has been contacted and informed of the outbreak. The risk for severe human disease is low but the situation will be monitored.

In South Africa thus far H7 AI has been detected on a farm in the Eastern Cape and a farm in the Southern Cape close to Heidelberg. The Heidelberg farm only tested positive on serology against AI H7 so it is difficult to say whether the same virus is associated with the Albertinia farms. An analysis of the molecular epidemiology of the Eastern Cape and the Albertinia virus will need to be performed to establish if these viruses are similar/related.

Private Vet submissions and surveillance

- In last month's issue we reported that a polecat in Paarl tested negative to **rabies** after it showed classic rabies symptoms. A final diagnosis for the neurological symptoms was not made in that case.

  Drakenstein Veterinary Clinic reported a similar case albeit in a different species. A male cross breed **pony** of unknown age was hospitalized for an open, non-healing wound on a hind fetlock . Treatment was underway when, after 3 days, the horse displayed severe depression before showing neurological symptoms of ataxia, salivation and aggression when approached. The animal was euthanased and, as rabies was one of a number of **neurotropic viruses** which were suspected, brain tissue was sent for testing. The results were negative for rabies. Cerebrum, cerebellum and EDTA blood was sent to Prof Marietjie Venter's laboratory at the Zoonoses Research Unit, University of Pretoria. The samples were tested for a variety of arboviruses which are associated with neurological symptoms in equines- Flavivirus genus, West Nile virus, Wesselsbron, Alphavirus genus, Shuni virus and EEV. These all also were returned negative. An alternative diagnosis in this case was equine tetanus with the open wound a route of infection although the symptoms were not classic for tetanus. A final diagnosis could not be made.

  Although it is getting late in the vector season for any of the ***Culicoides*** borne diseases it is important to keep them in mind between January and June in the Western Cape.

  (eds: we are grateful for Drakenstein Veterinary Clinic's case report which they submitted and continue to ask private colleagues to submit any cases or investigations which they feel may be of value within the scope of this report)

- Notification of a suspect African Horse Sickness (AHS) case was received from a vet working in the AHS protection zone. Fortunately further tests proved negative for AHSV and a diagnosis of bacterial pneumonia was made based on laboratory tests and a more detailed history of the case. This however highlights the importance of clinical surveillance of AHS in the AHS protection, surveillance and free zones. The surveillance effort with regards to AHS is primarily built upon clinical surveillance by veterinarians in these zones, and the future exports of equines from our Free zone is very dependant on having this surveillance in place.

  The State encourages this reporting and is available to assist in follow up investigation and sampling of AHS suspect cases if necessary

OIE Listed Disease logs

SV Area	User	Total Logs
Malmesbury	Michael Chapman	79
Malmesbury	Hendrik Hagen	75
Malmesbury	Elmien Coetzee	54
Vredendal	Irmi Speelman	46
Malmesbury	Esthea Jordaan	36
Vredendal	Ryan Turner	25

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EPIDEMIOLOGY REPORT

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June 2012
Volume 4, Issue 6

CASE REPORT
Boland: A rabies scare

Dr Aileen Pypers: SV Boland

Ed: The following case report highlights some of the issues surrounding rabies control, public perceptions of the disease and public ignorance surrounding vaccination.

Early in June, a Cape Fox was killed on a farm in SV Vredendal's area and diagnosed positive for rabies. Unfortunately at the time that it came onto the farm it had an altercation with a young Boerboel of unknown vaccination status belonging to the farmer and two Jack Russell Terriers belonging to a friend of the farmer that were present.

When SV Vredendal (Dr Hugo) found out about the case, the farmer neglected to tell him about the Jack Russell's and they returned to a built-up suburb of Durbanville with no-one's knowledge. Fortunately the owner of the dogs, worried about the rabies risk to her pets, took them to Goedemoed Animal Hospital where a clinical examination was performed and the dogs were vaccinated - (due to the fact that they were relatively new clients there was no previous vaccination history recorded). Goedemoed Animal Hospital also alerted the Boland SV office to the presence of these dogs in their area.

In the meantime, the Boerboel that had been bitten was euthanased by Dr Hugo. Further investigation revealed that it was uncertain whether the Jack Russells had been in close contact with the fox, as the owner was not present at the time of the attack. The owner also had no written proof of her dogs' vaccinations as they had been vaccinated as puppies by the AACL and she had subsequently lost those records whilst moving. Legislation regarding rabies dictates that in a case like this where no written proof of a rabies vaccination is available and the animals have been in direct contact with a rabid animal, the animals should be destroyed. Predictably the owner was completely unwilling to have her pets euthanased, believing that her dogs were adequately vaccinated and that they posed no risk to her community. Despite her adamance about this matter, she had previously that day had herself and her children vaccinated against rabies.

In order to avoid the traumatic scenario and time-delay of having to forcibly remove the dogs SV Boland, Dr Pypers together with Chief Director of Vet Services, Dr Msiza, took the decision to quarantine the dogs at a suitable facility and test blood for a rabies neutralising antibody titre (RNATT). Consultations with the OVI confirmed that despite the dogs being vaccinated on the Monday, a blood sample taken on the subsequent Friday would actually indicate the levels of circulating antibodies at the time of the alleged contact.

After several other facilities refused, Animal Welfare Society Stellenbosch very graciously agreed to quarantine the dogs until the RNATT results were available. After some delays getting the sample run, the results came back showing that one dog had a titre of 0.5 iu/ml and the other had a titre of 1.0 iu/ml. According to the OIE, a titre equal to or above 0.5 iu/ml is indicative of protection against rabies. However, there is always an element of risk in biological systems, so the decision was made to allow the dogs to return home under observation for the next six months. The owner signed a declaration indicating that she is aware of the risks and agreeing to keep her dogs confined to her property for the next six months and to take all the necessary precautions to ensure that they do not come into contact with other people and animals.

From this incident, it can be seen that it is extremely important to obtain as much information as possible from all involved parties when dealing with a case of potential rabies. It is also vitally important to assess all the risk factors on a case by case basis and to make a decision that is in the best interests of all involved, especially the unsuspecting public. Finally, it is critical that owners realise that it is required by law to have one's dogs and cats vaccinated against rabies (yearly or 3 yearly, according to the vaccine manufacturer's specifications in the Western Cape) and that keeping adequate records of vaccination is as crucial as the procedure itself.

Outbreak Report - High Path Avian Influenza H5N2 - Ostriches

Summary

- H5N2 high path AI confirmed
- 3 farms with active circulating virus, one of which has been slaughtered out already
- ELISA prevalence of between 8 - 13%
- Matrix gene prevalence at 8 - 100% on tracheal swabs with H5N2 confirmed on sequencing
- Negative virus isolation results
- All three associated farms under quarantine with one in contact farm also under surveillance
- Trace back testing underway
- Human health risk - low based on likelihood of this virus being the same as that involved in Oudtshoorn last year

Introduction

During surveillance of an area which had positive low pathogenic H7N1 avian influenza (see the May 2012 Epidemiology Report) we have discovered another farm in Albertinia which has high path avian influenza of the H5N2 subtype. Concurrently while doing a farm level sampling of a previously positive H7 farm (serologically positive only) in the Heidelberg area we also discovered strong evidence of a high path H5 avian influenza virus. Initial analysis of the H gene shows similarities with the HPAI virus which existed in the Oudtshoorn area last year. We currently are assuming these viruses are related to one another and will be treating them as the same virus which was discovered in Oudtshoorn last year.

Positive Farms

The initial farm (AI 635 Albertinia) discovered was as a result of H7 surveillance and was a farm within 10 km of the LPAI H7 farm discovered in that same area in May 2012. 1/12 (8% test prevalence) tracheal swab pools tested positive for the AI matrix gene but then subsequent H5 PCR's and sequencing data showed HPAI H5N2. The virus unfortunately could not be isolated. This farm did however also have positive serological results for the same sampling event with a 13% ELISA positive prevalence and varying levels (between 12.5% (1 of 8 samples) to 37.5%) of H5, H6 and H7 antibody specific HI positive titres. Not enough samples were positive on the various H types to confirm a co infection of other AI viruses but this is possible due to the recent H7 infection in that area.

The introduction of virus onto this farm is currently unknown although there is a trace back investigation currently underway to a farm in the Prince Albert region which supplied birds to this farm in early May 2012 – although under the normal proviso of having been tested negative for AI prior to movement. Slaughter out of this farm has already occurred with support from the Mosstrich abattoir. There is an in-contact farm which remains under quarantine and continued surveillance on this property is also underway.

Further surveillance (again as a result of AI H7 positive results) in the Heidelberg area also produced 2 farms which were highly pathogenic avian influenza H5N2 positive. One of the farms (AI360) was a previously identified H7 farm which had only been positive on H7 antibodies and where PCR results had been negative. This farm was undergoing a modified slaughter out process where groups of slaughter-ready birds were slaughtered at the abattoir after being tested for AI antigen using PCR. A full farm level sampling event then took place in early June and 8/30 (26% test prevalence) tracheal swab pool samples tested positive for the AI Matrix gene. 5/30 pools tested positive for the H5 subtype on PCR although once again no virus isolation was possible. The serological picture on the farm at that sampling event was not surprising with an 8% ELISA positive prevalence and corresponding prevalence's of between 16% and 33% on the HI testing of the positive ELISA samples. The source of infection on this farm is a potential wild bird or fomite source as the farm has been under quarantine and had not received live ostriches in the previous 12 months.

The third farm (AI542) currently involved in the outbreak in the Southern Cape is in close proximity to AI 360 from the Heidelberg district but also is close to a sero positive H5 farm which was slaughtered out earlier in the year (AI 710). This farm was grouped as a

positive farm in the HPAI outbreak of 2011 although positive PCR was never obtained to confirm our suspicions. It did have epidemiological links to the Oudtshoorn outbreak though. AI 542 did receive birds under red-cross permit from a farm in the Herbertsdale area (which is reasonably close to AI 635) and trace back testing is being done - although the farm in question tested negative to AI in May and June 2012. The sampling results from mid-June for AI 542 showed 6/6 (100% testing prevalence) tracheal swab pools testing positive to the AI matrix gene using PCR with 4/6 swab pools testing positive to the H5 specific PCR.

Control measures and actions

A JOC has been established on a weekly basis in Swellendam with members of SAPS, traffic and disaster management also being included. Discussion points made there are forwarded to both ostrich and poultry industry representatives who are assisting in the outbreak control. An AI control zone has been established which includes both infected properties and in contact properties. This can be viewed online at http://goo.gl/maps/nTj6 or in figure 1 below. This control zone will have all movement of poultry restricted. For the movement protocol please click or paste the following link into your web browser:
http://www.elsenburg.com/vetepi/epireport_pdf/20120709_SCAICA_PoultryMovementPolicy.pdf

Plans to slaughter the positive farms have been underway since news of the outbreak was received and focus is currently on the 2 positive farms in the Heidelberg district. Initial decisions have been made to slaughter some birds on the farm as abattoir slaughtering of these birds is not a logistical or practical method for these cases.

Surveillance will begin in the control area once the immediate control actions on the positive farms have been completed.

Addendum:

We have also discovered a low path H5N2 avian influenza virus on a farm in the Boland. This area is not dense in terms of ostrich farms but the risk of transmission to poultry farms is higher than in the Oudtshoorn or Southern Cape situations as a result of the proximity to the commercial poultry units in the Boland. Plans have begun to slaughter these ostriches and thus decrease the risk of spreading this low pathogenic virus.

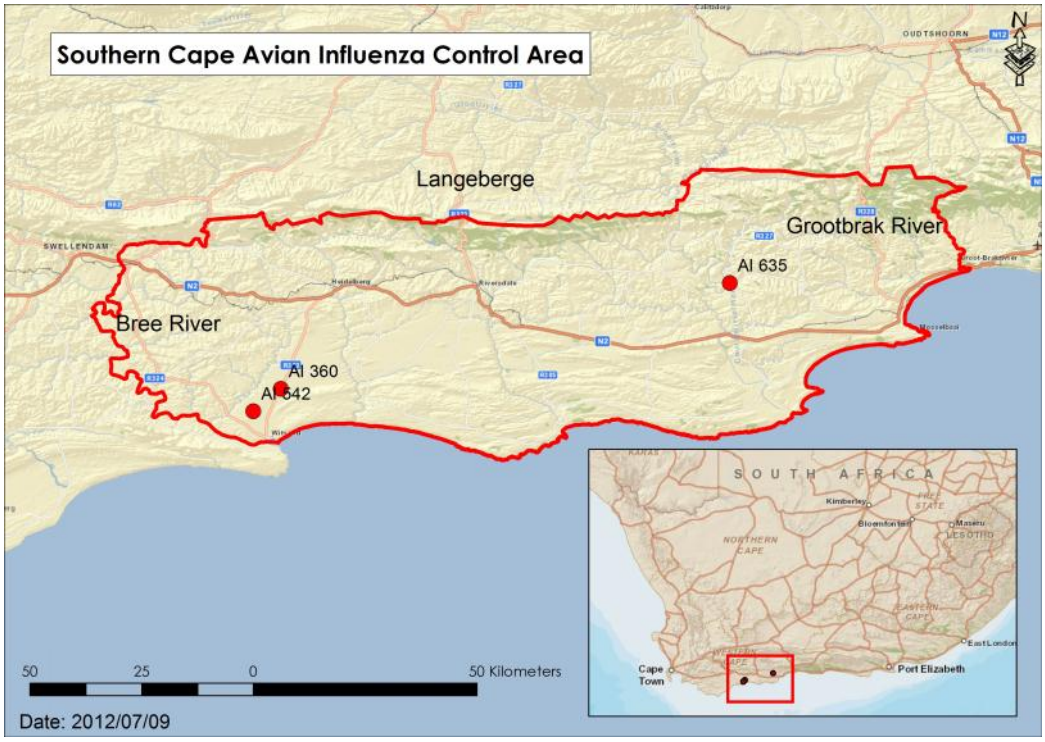

Figure 1. The Southern Cape Avian Influenza Control Zone (SCAICA). It is bordered on the west by the Bree river, the north by the Langeberge and the east by the Groot Brak river.

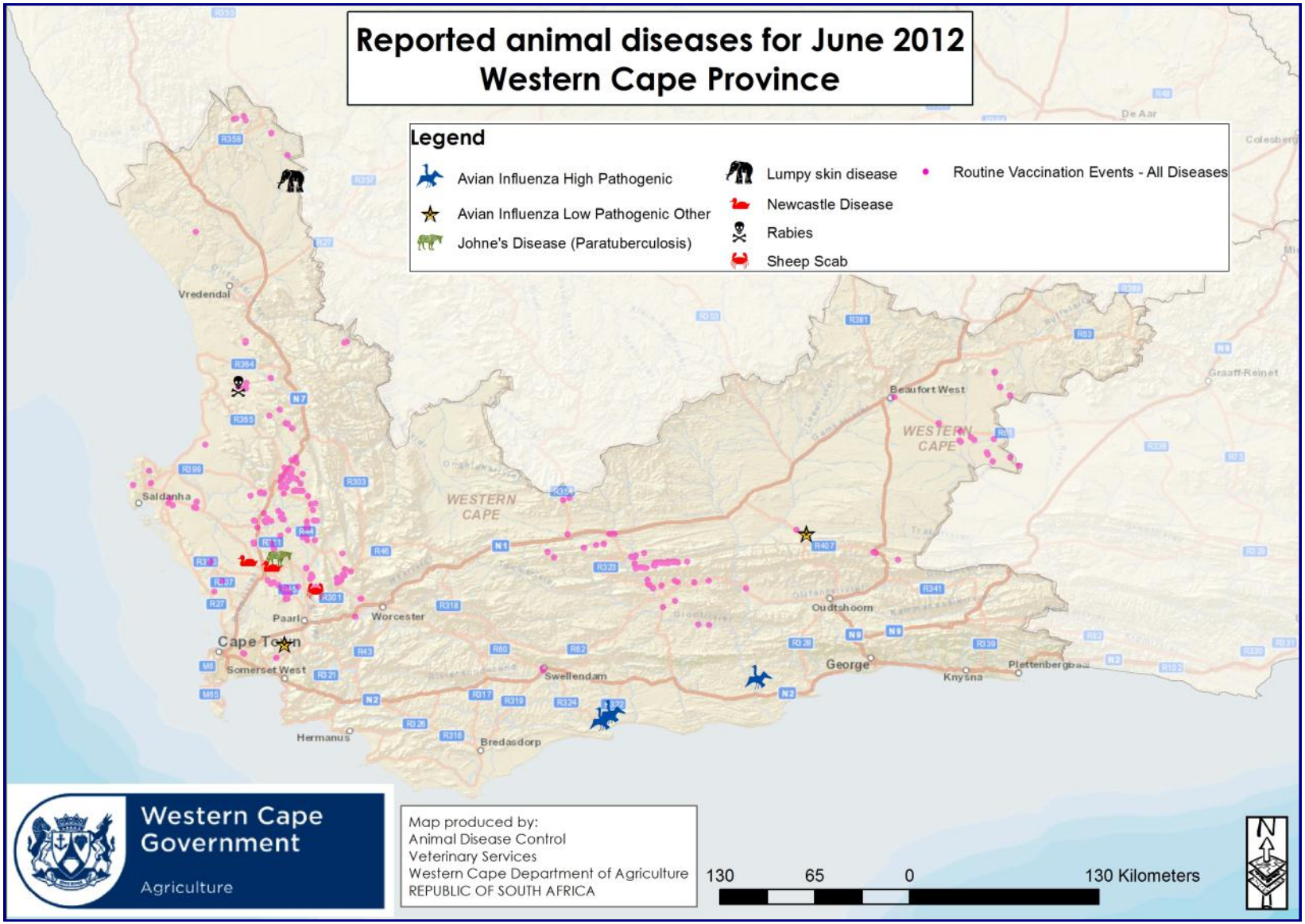

Figure 2. Disease outbreaks in the Western Cape Province identified during June 2012. Included are all the routine vaccination events (disease not specified) performed by State officials that were logged during June.

Outbreak Events

- Two suspect cases of **lumpy skin disease**, in the **Vredendal** area and in **Stellenbosch** (see picture left), have been noticed by animal health technicians in the field. As this is a notifiable disease, we would like to urge private veterinarians to report clinical cases they see (contact details below).
- Two outbreaks of **virulent Newcastle disease** occurred in flocks of unvaccinated **backyard hens** in the **Malmesbury** area.
- A Cape Fox in the **Clanwilliam** area was confirmed rabies positive. See the article by Dr Pypers in this newsletter for details.
- A sheep farm near **Riebeeck West** was confirmed positive for **Johne's** disease when an emaciated ewe was slaughtered and intestinal histopathology and bacterial culture testing performed. The farmer had last introduced new stock in 1975, does not normally see emaciated sheep and has an increasing lambing percentage, but his neighbor, with whom he shares a fence, has a **Johne's** positive flock.
- **Sheep scab** was discovered on a farm near **Wellington** after the farmer bought in new stock from the Bidow Valley near **Clanwilliam**. The sheep showed itching and loss of wool.

SV Area	User	Total Logs
Malmesbury	Hendrik Hagen	102
Beaufort West	Nita Vosloo	80
Malmesbury	Michael Chapman	59
Malmesbury	Elmien Coetzee	44
Beaufort West	Anton Barnard	33
Malmesbury	Esthea Jordaan	27

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Western Cape Government
Agriculture

EPIDEMIOLOGY REPORT

VETERINARY SERVICES
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National Foot and Mouth Disease Survey

Western Cape participation and initial coverage

Introduction

DAFF embarked on an FMD survey on a country- wide basis which was scheduled to begin early in July. This has been prompted as a result of FMD activity during 2011 in KZN. To regain FMD zonal freedom a country wide survey in the parts of RSA that are to be considered free of FMD is necessary. The sampling frame was based on underlying cattle population data obtained from the last country wide cattle census and risk based surveillance techniques were also applied where areas more likely to be infected having to undergo a higher sampling rate.

Western Cape

The Western Cape fortunately falls outside of these risk areas and a total number of 74 sampling points were required to be sampled by our officials This accounted for 5.3% of the countries sampling points (n=1374) with the WCP had the second lowest number of sampling points required (compared to 78 in the Northern Cape and 73 in Gauteng). A total of 17 animals per property were clinically inspected for FMD and then sampled (serum). If a sampling point had less than 17 animals present then all animals were sampled. State vets were requested to choose their sampling points based on risk factors which are listed below:

- Farms with animals with known suspicious FMD clinical signs
- High frequency of movement onto/off the farm
- High risk properties such as feedlots or speculators
- Farms containing animals of unknown origin

DAFF provided a sampling kit per farm and courier services for sample submissions to OVI were organised by DAFF. A basic questionnaire was also filled in per sampling point to show whether any suspect clinical lesions were seen and to indicate if any risk factors associated with potential FMD infection were present on the property.

The time period given to complete the initial round of the survey was between the 2nd to the 27th July 2012. Western Cape officials completed all 74 sampling points between 27 June and the 11 July 2012. As can be seen in Fig 1 the Swellendam State vet area had the most sampling points to cover. State vets were requested to spread their sampling points through their areas as evenly as possible.

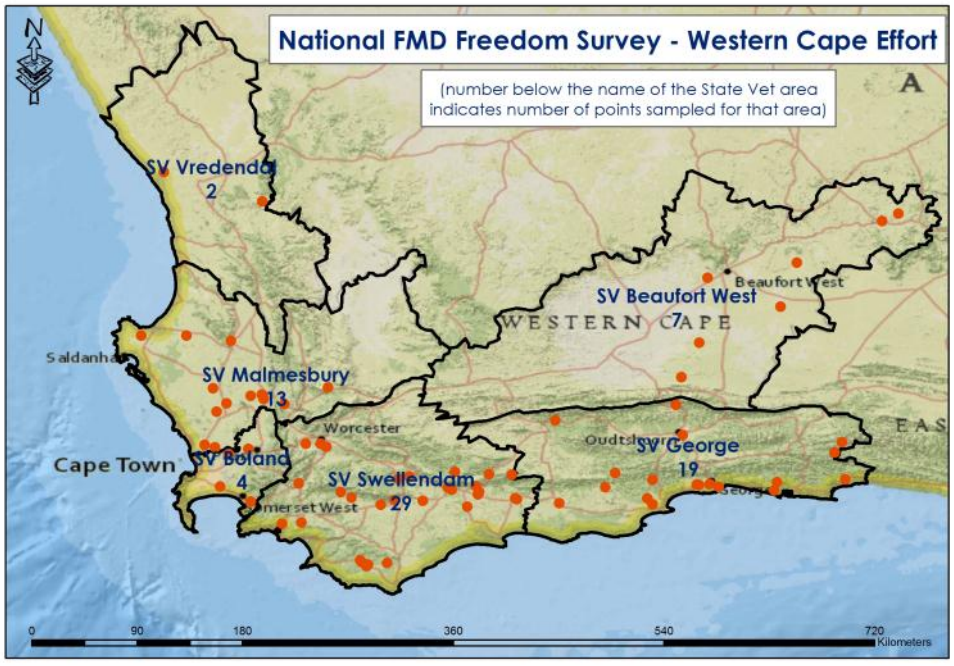


Fig 1: FMD survey - choice of farms within WCP

Follow-up procedures on laboratory reactors is part of the survey and is essential since this is a sero-survey. This is particularly true since this is a screening survey and the test used is highly sensitive for FMD antibodies. Western Cape Veterinary services have begun follow-ups on a number of farms where suspicious serology results were found in order to establish the actual status of those farms.

SASVEPM Congress 2012

Pre-congress Workshop of Databases for Veterinarians

The annual congress of the Southern African Society of Veterinary Epidemiology and Preventive Medicine was held in Pretoria between the 1st and 3rd of August 2012. There was however a pre-congress workshop on the 29th and 30th of July which was organised by members of the Epidemiology section of Western Cape Veterinary Services on behalf of SASVEPM. Training was given to 11 attendees and the course was practically designed to teach database design with specific reference to veterinary officials. We made use of an actual outbreak dataset and evaluated the challenges and management of the data thereof. The delegates attending the workshop came predominately from the State and we had representation from DAFF, KZN, Free State, Eastern Cape, North West Province, and Gauteng.

SASVEPM Congress

The SASVEPM congress was a 3-day affair and the turnout was excellent this year with approximately 130 delegates with Western Cape officials well represented. There were 3 continuing education presentations: the **Peste des Petits Ruminants** situation in Tanzania (unfortunately **Dr Fred Kivaria** from Tanzania was not available at the last minute to come and present his work so this was presented on his behalf by SASVEPM), the recent **CEM** outbreak in horses in RSA (**Prof Alan Guthrie, Dr Martin Schulman, Dr Kate May** and **Dr Bronwyn Keys** jointly presented this information) and then **Prof Lucille Blumberg** presented various **zoonotic outbreak** data from her work at the NICD.

The congress theme was "Outbreak Investigation: Science and Intuition" and the speakers this year really excelled and the data presented was very interesting.

Members of the Western Cape veterinary services also were authors and co-authors on a number of papers, and they are listed below:

AN OUTBREAK OF HIGHLY PATHOGENIC AVIAN INFLUENZA IN DOMESTIC OSTRICHES: THE CURRENT SITUATION IN SOUTH AFRICA - ***Van Helden, L.S., Grewar, J.D., Visser, D., Dyason E.*** *and* ***Koen, P.,***

AN OUTBREAK OF AFRICAN HORSE SICKNESS IN MAMRE, SOUTH AFRICA DURING 2011 - *Weyer, C.T.,* ***Grewar, J.D.,*** *Guthrie, A.J.,* ***Davey, S.*** *&* ***Buhrmann, G.***

DATA ANALYSIS OF ENQUIRIES TO A SOUTH AFRICAN RADIO PROGRAMME ON ANIMAL MATTERS - ***AS Cloete*** *and* ***JD Grewar***

Some of the talks produced some lively debate and comment and it is quite clear from the interaction between delegates that continued co-operation between Government institutions and private industry is necessary to scientifically improve systems which improve trade and increase food security.

Prof Lucille Blumberg from the NICD won the SASVEPM Epidemiology Prize for 2012 and **Dr Derryn Petty** won the prize for the best presentation at the congress for her talk on non-typhoidal salmonellas in the Gauteng region.

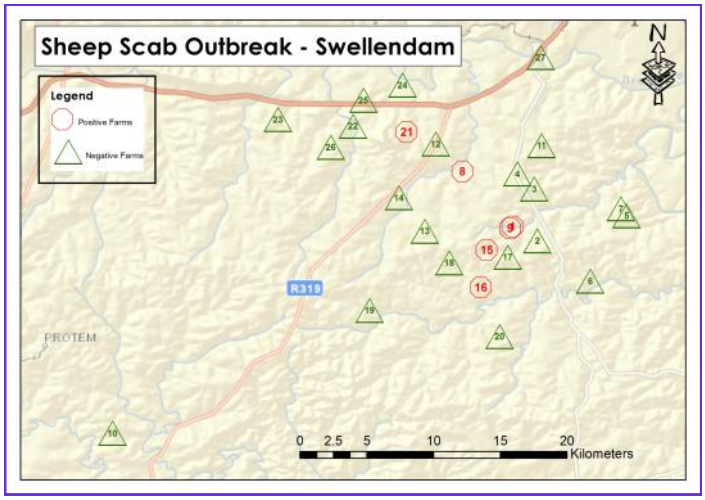
The editors wish to thank Western Cape Dept. of Agriculture for affording us the opportunity of attending this congress.

Swellendam Sheep Scab - Approach and Network Analysis

Grewar, J.D. and Mare, R.

INTRODUCTION

On the 1st of June 2012 a farmer from the Swellendam district (see farm ID #1 on map and network on this page) made contact with his local AHT (Gerhard van Wyk) in order to have pruritic sheep investigated. The AHT visited the farm and subsequently diagnosed sheep scab as the cause of discomfort.



INVESTIGATIONS AND TREATMENT

Three other AHT's from Swellendam (Werner Gouws, Thuli Tsele and Wynand Fourie) were brought in to assist with the subsequent investigations on the surrounding farms which took place between the 4th and 21st June 2012. A total of 27 farms were visited (hence the ID's on the map and network ranging from #1 (initial farm) to #27). A further 5 farms were diagnosed with sheep scab which brought the total to 6. This therefore shows a between farm prevalence of 22%. All infected farms were quarantined and in total the population at risk on those farms totalled 5 968 animals with an average of 994 per infected farm. The total population at risk for the outbreak, taking into consideration all associated farm totalled 38 264 sheep at an average of +- 1400 per farm. As can be seen on the map these farms are all in relatively close proximity with only farm #10 outside a radius of about 20 km. This farm was included as it was linked to farm #8 (infected farm) by a common farm owner.

Treatment (Dectomax) of infected flocks was performed under supervision of the AHT's from Swellendam. This supervision included taking a thorough census of the sheep treated. Different colour spray-paint was used to mark sheep treated on the two occasions. Co-operation from the affected farmers was good and the total investigation, from initial detection to final treatment, took 3 weeks. Follow up investigations to ensure treatment worked is not included in this date range. The average number of days of quarantine to treatment number one was 6.7 days and on all 6 occasions treatment two took place 7 days after treatment 1.

NETWORK ANALYSIS

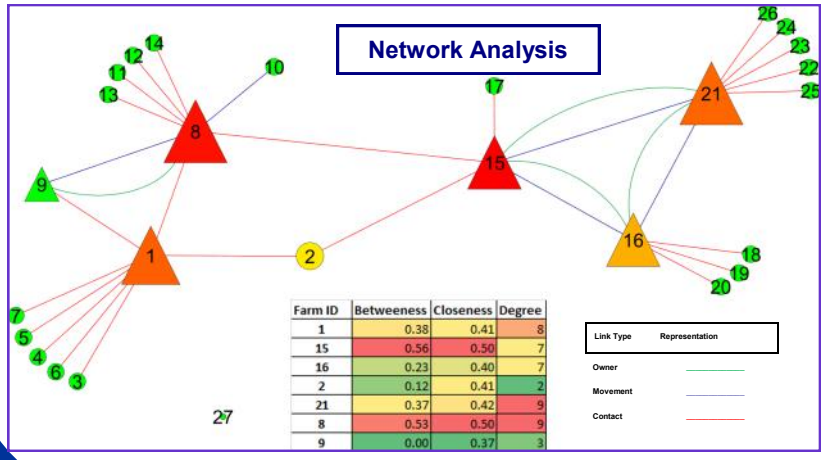
The network of farms is shown on the schematic on this page. Infected farms (ID's #1, #8, #9, #15, #16 and #21) are shown as triangles while linked farms that were not infected are shown as circles. In this network we have symbolised the size of the representing symbol based on the number of links in the network that farm had. This means that farm #21 and farm #8 have the largest symbols (having 9 links in total) while farm #27 has the smallest symbol by not being linked to any farm in the network. The colour of the symbol is based on the strength of the Betweenness measure for that farm within the network. A reminder for the meaning of Betweenness: this measure essentially shows what impact this node (farm) has in linking other members (farms) within this network. It can be visually seen why farms #15 and then #8 have the highest betweenness measure, particularly since if farm 15 was removed from the network the left and right hand parts of this particular network would have no links between them.

Having a look at the network it is immediately evident that the highest risk of spread of sheep scab (as one would expect) is the **movement** of stock between infected farms. Of the 4 occasions this occurred all 4 times farms on either side of that movement became/were affected. Since movement between farms in this case is most often associated with the same **owner** this is true for between farm ownership but the one time an infected farm was linked to another only by ownership the infection did not spread (see Farm #8 <> #10). On occasions where **contact (spatially)** is the link between farms there were 3 occurrences of evidence of infection spread, although one of these farms (#9) also has an owner and movement link with another infected farm (#8).

DISCUSSION

It is evident from this investigation that movement between infected farms is a high risk activity for sheep scab spread while contact with an infected farm plays a lesser role it is still significant, particularly shown by the fact that if the link between #8 and # 15 did not exist the network would have been significantly disrupted.

The authors wish to thank the Swellendam office and in particular the AHT's involved for their information and hard work.



Farm ID	Betweeness	Closeness	Degree
1	0.38	0.41	8
15	0.56	0.50	7
16	0.23	0.40	7
2	0.12	0.41	2
21	0.37	0.42	9
8	0.53	0.50	9
9	0.00	0.37	3

Fig 2: Sheep Scab farm network

Outbreak Map

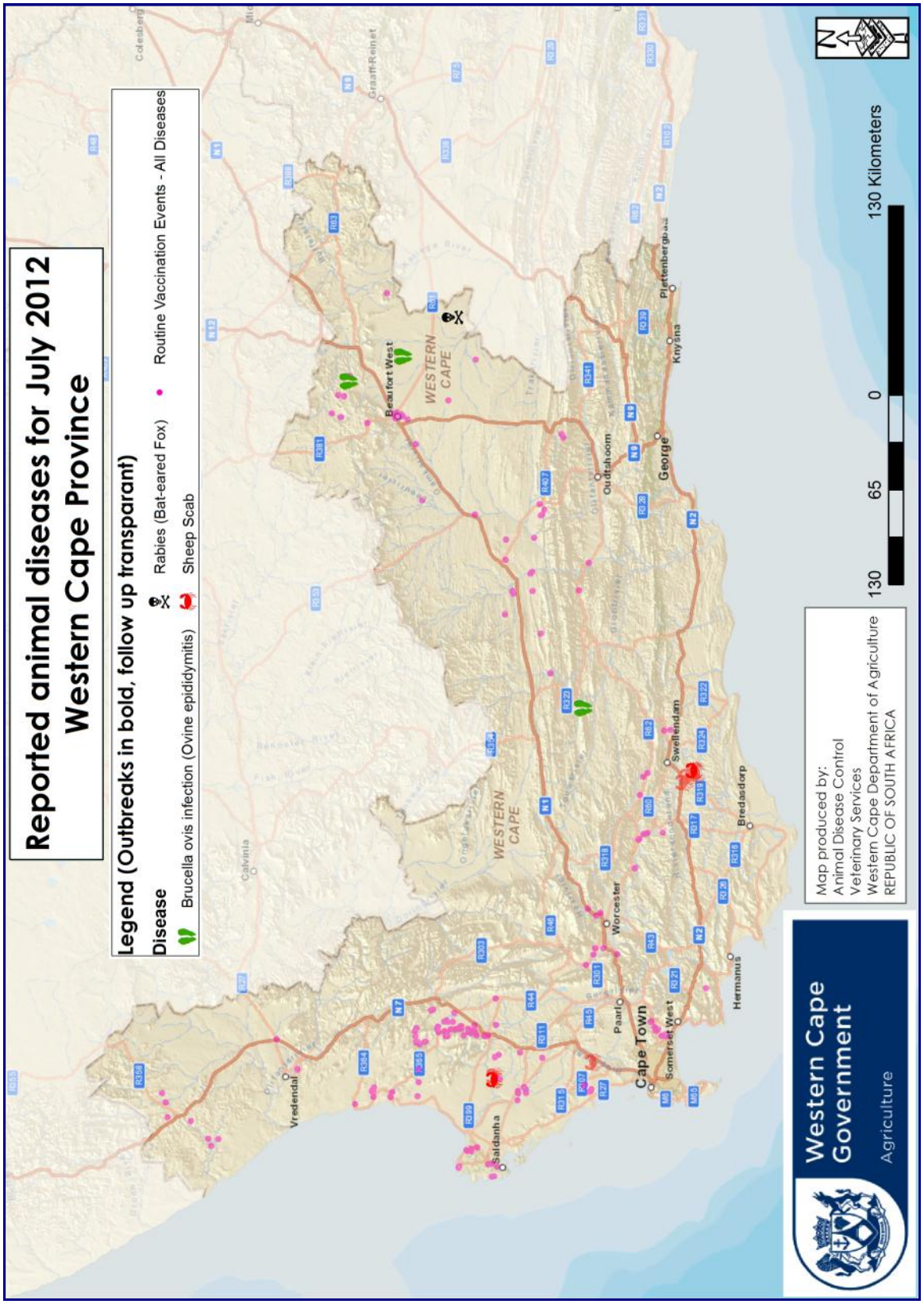


Figure 3. Disease outbreaks in the Western Cape Province identified during July 2012. Included are all the routine vaccination events (disease not specified) performed by State officials that were logged during July.

Outbreak Events

- Several positive **sheep scab** farms were discovered in the **Swellendam** SV area. For more information on this outbreak, see the article on page 3 of this report.
- In addition, two farms positive for **sheep scab** were unearthed in the **Malmesbury** SV area. Interestingly, both farmers had recently bought sheep from a third farmer, whose stock, on investigation, were found negative for sheep scab. Further tracing to find other affected farms is underway.

- An apparently tame bat-eared fox approached a farm-house near **Rietbron.** It became aggressive when confronted by the farmer's dog and was subsequently killed by the farmer. The fox tested positive for **rabies**. Both the farm dog and the dogs on neighbouring farms were vaccinated against rabies in response to the positive case.
- Three farms with positive serology for ***Brucella ovis*** were identified, one near **Ladismith** and two in the **Beaufort West** area. These farmers were advised to slaughter out their positive rams.

OIE Listed Disease

SV Area	User	Total Logs
Malmesbury	Hendrik Hagen	74
Malmesbury	Michael Chapman	45
Vredendal	Irmi Speelman	41
Beaufort West	Anton Barnard	34
Beaufort West	Cobus Ferreira	19
Boland	Maresa Fourie	16

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Western Cape Government
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EPIDEMIOLOGY REPORT

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ISVEE 13: Maastricht

The International Symposium on Veterinary Epidemiology and Economics was attended by three state veterinarians from Western Cape Animal Health, two fully sponsored and one partially sponsored by the Southern African Society of Veterinary Epidemiology and Preventative Medicine (SASVEPM).

The symposium was held in the ancient city of Maastricht, in the southern part of the Netherlands about ten kilometres from the Belgian border, and was jointly organised by the Dutch and Flemish Societies for Veterinary Epidemiology and Economics. Fittingly, the theme was "Building Bridges, Crossing Borders"

Plenary speakers from each of the five days of the symposium presented fascinating topics relating to modern veterinary epidemiology, including use of **social technologies** for disease and disaster surveillance and reaction, use of **epidemiology in a private practice** setting, links between **climate change** and animal diseases; the importance of epidemiology within the **food security** sector and the controversial research into transmission of **avian influenza viruses between mammalian hosts**, the publication of which several governments attempted to prevent by imposing a ban in 2011 and earlier this year.

The remainder of the symposium consisted of over 300 oral presentations running in five parallel sessions and approximately 500 posters on display. Topics varied widely, from aquatic animal epidemiology to disease prioritisation to engaging local communities in participatory epidemiology. Some of the more interesting presentations or points made are listed below.

Fig1: The location of Maastricht in the Netherlands

- Correlation ≠ Causation
- Schmallenberg virus: The incredible spread of this vector borne disease and the short period needed for it to extensively cover certain countries in Europe. The major impact of this disease has been production losses (dairy output and in terms of reproduction) as well as the social impact of farmers delivering malformed lambs and calves.
- The different ways that surveys for disease freedom can be monitored and shown to be accurate based on historical data.
- The use of practical clinical epidemiology - an example

ISVEE 13: Maastricht cont..

was made of how all aspects of epidemiology, from observational and experimental epi through to how statistical and mathematical methods can be used in practice to improve the production of farms. For those interested an open source stats website was shown to delegates which is worth visiting - *www.vassarstats.net*

- A presentation of the recent outbreak of arbovirus infections in horses throughout Australia was very informative and highlighted some of the challenges of finalising a diagnosis for some of these more novel aetiologies. One interesting method the Australians applied here was to make use of a very broad case definition whilst still making strong conclusions based on the data.
- Two talks discussed how the vector: host ratio regarding African horse sickness may have a significant impact on the spread of this disease.

All of our Western Cape representatives participated actively in the symposium by presenting between them one oral presentation and two poster presentations.

Fig 2: Dr Lesley van Helden presenting her abstract entitled: AN OUTBREAK OF HIGHLY PATHOGENIC AVIAN INFLUENZA IN DOMESTIC OSTRICHES: THE CURRENT SITUATION IN SOUTH AFRICA - ***Van Helden, L.S.***, ***Grewar, J.D.***, ***Dyason E.*** *and* ***Koen, P.***

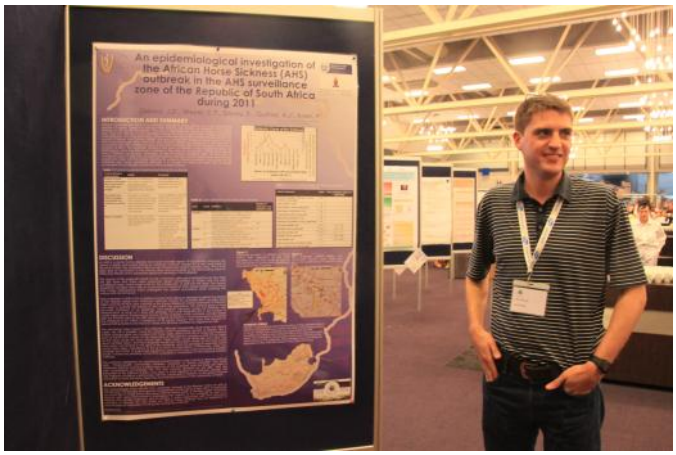

Fig 3: Dr John Grewar with his poster entitled: AN EPIDEMIOLOGICAL INVESTIGATION OF THE AFRICAN HORSE SICKNESS (AHS) OUTBREAK IN THE AHS SURVEILLANCE ZONE OF THE REPUBLIC OF SOUTH AFRICA DURING 2011- ***Grewar, J.D.***, *Weyer, C.T.,* ***Davey, S.***, *Guthrie, A.J., and* ***Koen, P.***

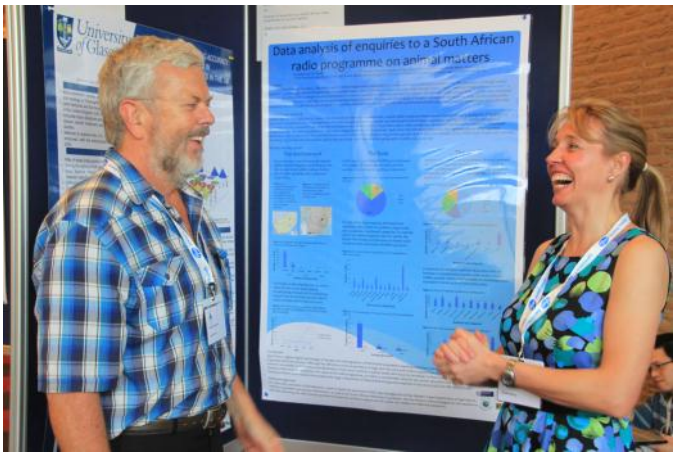

Fig 4: Dr Annelie Cloete (right) with her poster entitled: DATA ANALYSIS OF ENQUIRIES TO A SOUTH AFRICAN RADIO PROGRAMME ON ANIMAL MATTERS - ***Cloete, A.S.*** *and* ***Grewar, J.D.***

(On the left is Dr Peter Geertsma, a State Vet from Gauteng who also attended the symposium)

The discussions resulting from presenting uniquely South African issues to the international community were very valuable.

The editors wish to thank Western Cape Dept. of Agriculture for affording us the opportunity of attending this congress, as well as to SASVEPM for their generous sponsorship.

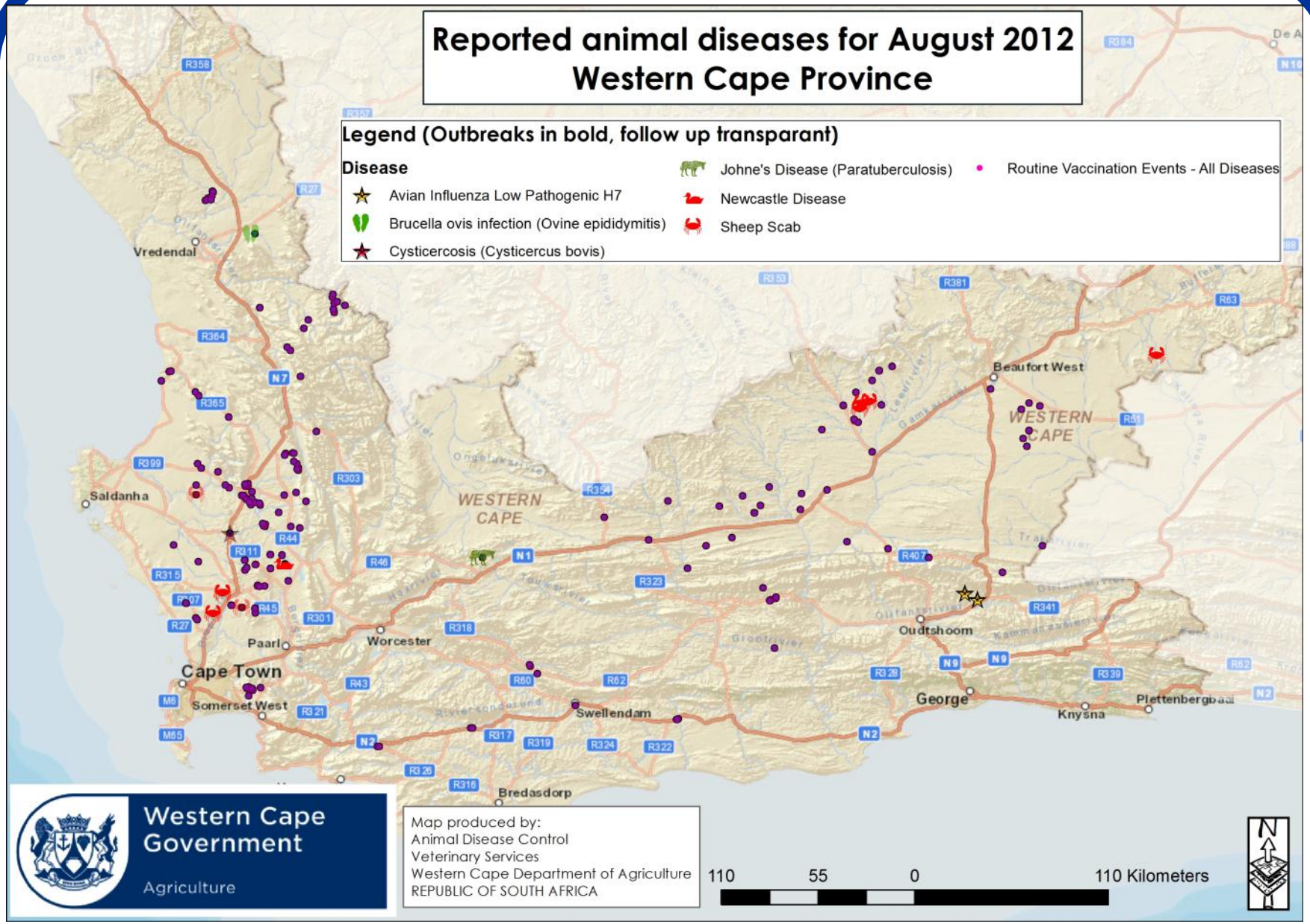

Figure 3. Disease outbreaks in the Western Cape Province identified during August 2012. Included are all the routine vaccination events (disease not specified) performed by State officials that were logged during August.

Outbreak Events

- **Low pathogenic avian influenza** of the **H7** type was confirmed on two ostrich farms in the **Oudtshoorn** area. Both farmers have noticed an increase in respiratory signs and green urine amongst the ostriches and follow up investigations are ongoing.
- ***Brucella ovis*** infection is persisting in the rams of a farmer near **Vanrhynsdorp**, owing to his erratic testing and slaughter schedule. Farmers are advised to test their rams for *B. ovis* every two to three months.
- Several outbreaks of **sheep scab** have occurred in the **Malmesbury** and **Beaufort West** areas.
- Two farms in the Witzenberg local municipality surrounding **Ceres** have been confirmed positive for **Johne's disease**. Both Dorpers and Dohne merinos were affected.
- The unvaccinated backyard broilers of a farm worker near **Riebeeck West** suffered a 70% mortality rate from an outbreak of virulent **Newcastle disease**.

OIE Listed Disease logs

State Vet Area	User	Total Logs
Malmesbury	Hendrik Hagen	88
Malmesbury	Esthea Jordaan	35
Beaufort West	Anton Barnard	34
Vredendal	Irmi Speelman	26
Boland	Maresa Fourie	19
Beaufort West	Nita Vosloo	17

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EPIDEMIOLOGY REPORT

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Buffalo movements within, out of and into the Western Cape Province

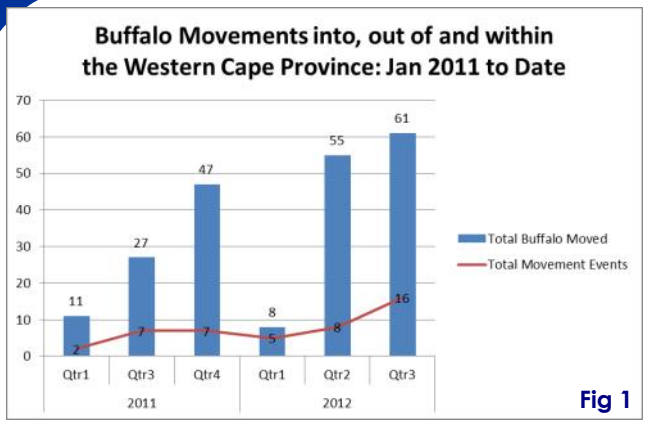


Fig 1

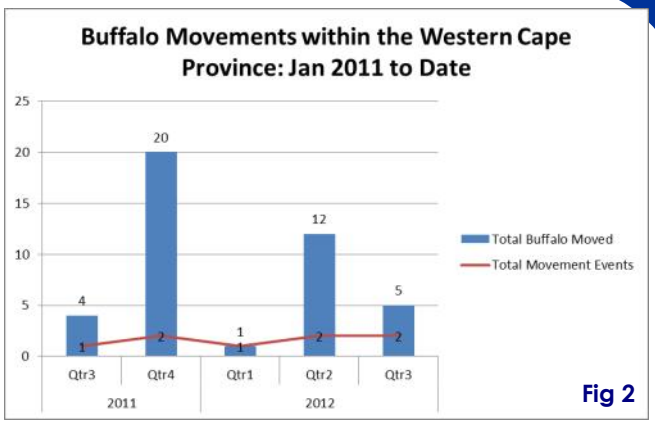


Fig 2

Introduction

Buffalo movements within and between the provinces of South Africa are controlled by State Veterinary Authorities and permission must be granted for every movement by the relevant Provincial Veterinary Services directors involved. From the beginning of 2011 the Western Cape Veterinary Services (WCVS) began capturing the data relating to these movements (where the Western Cape Province (WCP) was involved in the movement) electronically and the data of the past 18 months is shown here. A network analysis is also referred to in the text although this data is not shown.

Descriptive Movement Statistics

Figure 1 above shows the total number of movement requests (red line) managed by WCVS over the period under review and the number of buffalo moved during these events (blue bars). Between 2011 and 2012's second quarter (Q2) there was a significant increase in movements of buffalo - from 0 in 2011 to 8 in 2012. A general trend of increasing movement requests towards the end of the year is also evident, however having more data available would be necessary to show whether this trend is consistent year to year. There is evidence however of an increase in the total number of movement requests between 2011 and 2012, with the total number of requests in 2011 (n=16) being far exceeded in 2012 already (n=29) with still 4 months of the year not yet included in the analysis.

A breakdown of the movement origin and destination was also analysed and the movements into and out of the WCP followed similar trends to the general trend in Fig 1 but the movements of buffalo within the borders of the WCP have been maintained at very low numbers in terms of requests with evidence of a decrease in the total number of buffalo moved between 2011 and 2012 to date (see Fig 2).

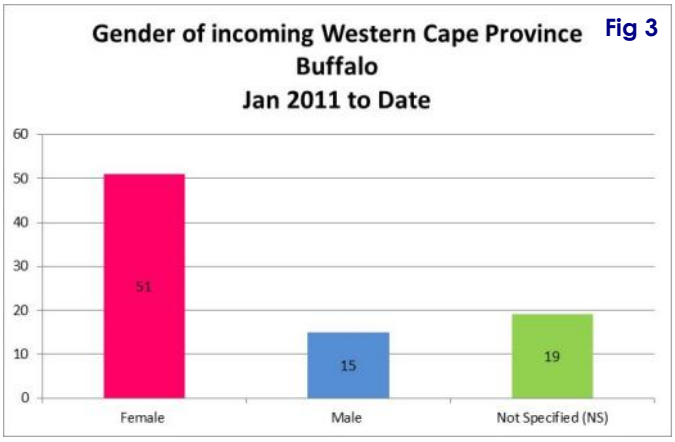


Fig 3

Figure 3 shows the gender trend of buffalo entering the WCP where the majority of incoming buffalo where female (note the NS category - the outgoing data in terms of gender had too many animals in the NS category to be worthwhile analysing)

The provincial source of buffalo (see Fig 4 on page 2) clearly shows the majority of buffalo entering the WCP come from the Limpopo Province with 11 movements (58% of incoming movements) totalling 62 buffalo (73% of incoming buffalo). In terms of high risk FMD Provinces (those that have bordered on

Continued on page 2→

WCP Buffalo movement continued

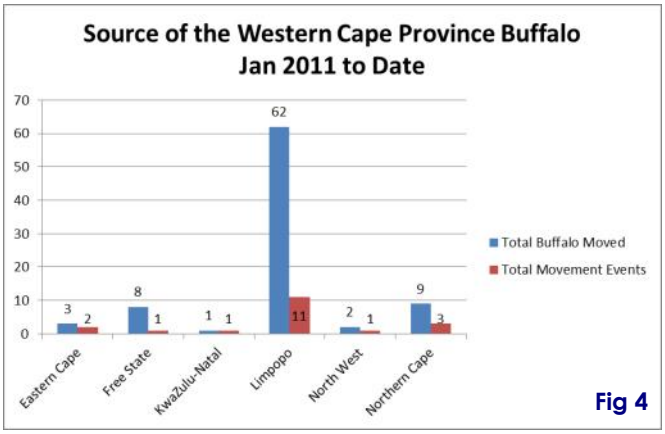


Fig 4

the FMD control zones) it is interesting to see that no buffalo originate from Mpumalanga and only 1 movement consisting of 1 buffalo has occurred between KZN and the WCP.

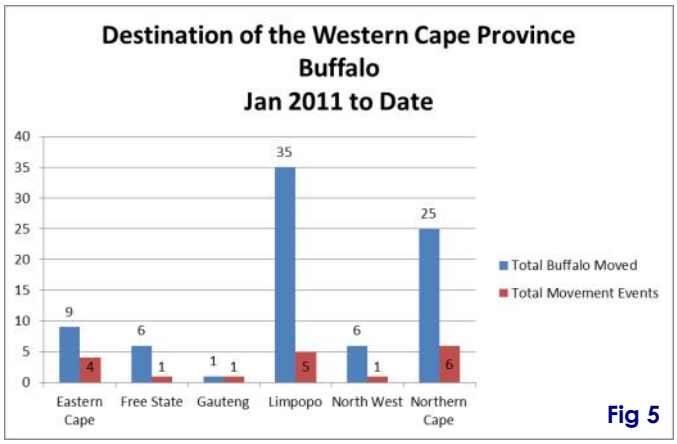


Fig 5

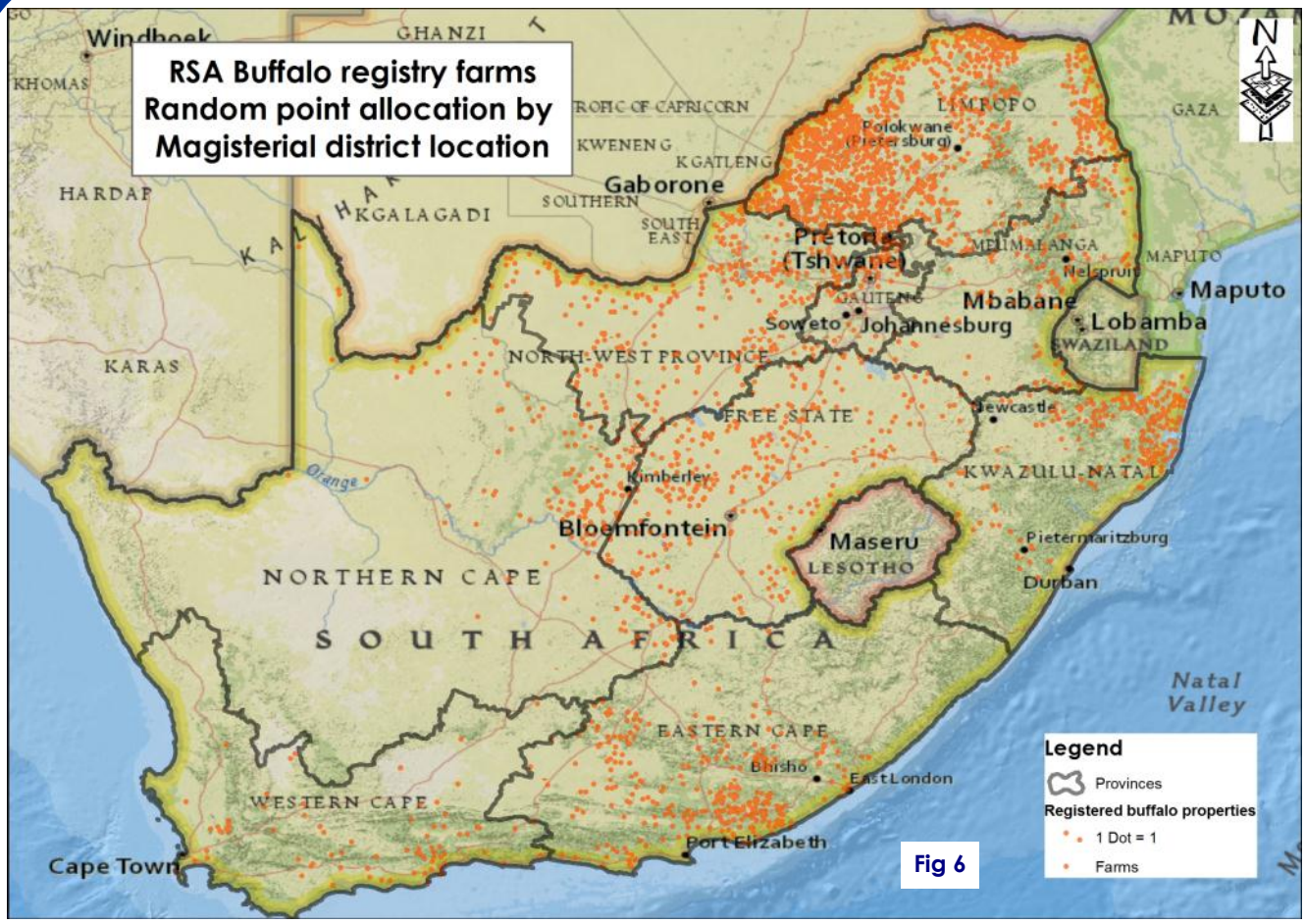
Outgoing movements (see Fig 5) of buffalo from the Western Cape to other provinces has a more even distribution between 3 major provinces namely the Limpopo Province, the Northern Cape and the Eastern Cape. 33% of movements (n=6) and 31% of buffalo (n=25) have moved from the WCP to the Northern Cape. The movements to the Limpopo Province are in the region of half the incoming totals from that province (5 movements consisting of 35 buffalo) while the Eastern Cape received 9 buffalo in 4 movements from the WCP.

Network of buffalo farms associated with WCP buffalo movement

The data available to the WCP only has those movements that have the WCP associated with them. A full network analysis of buffalo movement is thus not possible by this office and analysing the network of movements within, into and out of the WCP has limited value as a result of this. The analysis was however completed and some of the more interesting observations are listed below. (bear in mind this is only valid for the past 18 months)

- The network is very fragmented with 7 smaller networks existing between farms. Also the largest network of 25 (of a total of 46) farms is only this big as a result of 1 auction which supplied 2 individual farms on the same day in two otherwise well segregated networks.
- There are 17 Western Cape farms that had movements associated with them. 5 of these do not have external sources of buffalo but will be translocating buffalo off their farms. 8 farms have a single source of buffalo. This means that 76% of Western Cape buffalo farms actively moving buffalo have none or one source of external buffalo.
- 9 Western Cape farms do not move buffalo off their farms while 4 have moved buffalo to only one other destination. This means that 76% of active Western Cape buffalo farms either do not move buffalo off their farms or only move buffalo to one source.
- The above 3 points really show that the situation as it stands defers a low risk of disease transmission between buffalo farms involved in the WCP movement system.
- There is one buffalo farm which has had 7 different sources of buffalo over the past 18 months. This is the exception in the WCP network.
- Only 3 of the 17 WCP farms moved buffalo to the same destination on more than one occasion and only one WCP farm received buffalo more than once from the same source. This shows that repeat movements within the WCP system are limited. The reason for this is not know but it can be speculated that the major purpose of keeping buffalo in the WCP is for breeding purposes and receiving genetics from varying sources would strengthen the gene pool in the WCP.

Figure 6 on page 3 is a randomised dot plot where registered buffalo holdings (data sourced from DAFF website) have been randomly allocated a location within the magisterial district they exist in - NB the dot location is NOT the actual location of each farm and also the activity status of the farm is not known as this information is not available. It can however be immediately seen that the majority of holdings occur in the Limpopo province, and in particular its more western districts. KZN, Eastern Cape and Northern Cape have clustering of farms in their north easterly, southerly and easterly regions respectively while distribution in the rest of the country is relatively even. Based on this data the movement between the Limpopo and WCP makes sense just in terms of farm numbers in Limpopo although one might have expected more movements between **Continued on page 3→**



the Eastern Cape and WCP.

Movement of buffalo is very strictly regulated as a result of the risk of spreading disease by buffalo to domestic cattle. Prior to any movement all buffalo (uniquely identified) are subject to testing for foot and mouth disease (serology), corridor disease (serology and PCR), tuberculosis (Skin test) and brucellosis (serology). More information on the requirements of buffalo movement can be found on the DAFF website or by clicking on the link below:
http://www.nda.agric.za/vetweb/Disease%20Control/Buffalo/20th%20draft%20protocol%20-%20buffalo%20policy.pdf

Outbreak Events

- **Sheep scab** has been identified in the **Leipoldtville** region of the **Vredendal** SV office. Trace back show sheep originating in the **Piketberg** region and this farm was also diagnosed positive so treatment was also instituted there.
- 2 reoccurrences of ***Brucella ovis*** in rams occurred in the **Vanryhnsdorp** region where farmers had discontinued the advised 2-3 months testing protocol and on recent tests again found positive animals.
- **Rabies** in a **bat-eared fox** was diagnosed in **Piketberg** after the animal was destroyed by a farmer after it did not show fear when being chased away. The dogs and cats on the farm had recently been vaccinated against rabies but were revaccinated.
- A highly suspect cases of **rabies** was reported in the **Swartland**. In this case the farmer was treated with immunoglobulin after he was bitten on the leg by an aberrant **bat-eared fox**
- Another **rabies** case was confirmed in a **pole-cat** in **Beaufort West** after the animal chased a farmers dogs (no contact was made) before being destroyed by the farmer. Domestic dogs and cats within 10 km buffer were vaccinated in response.

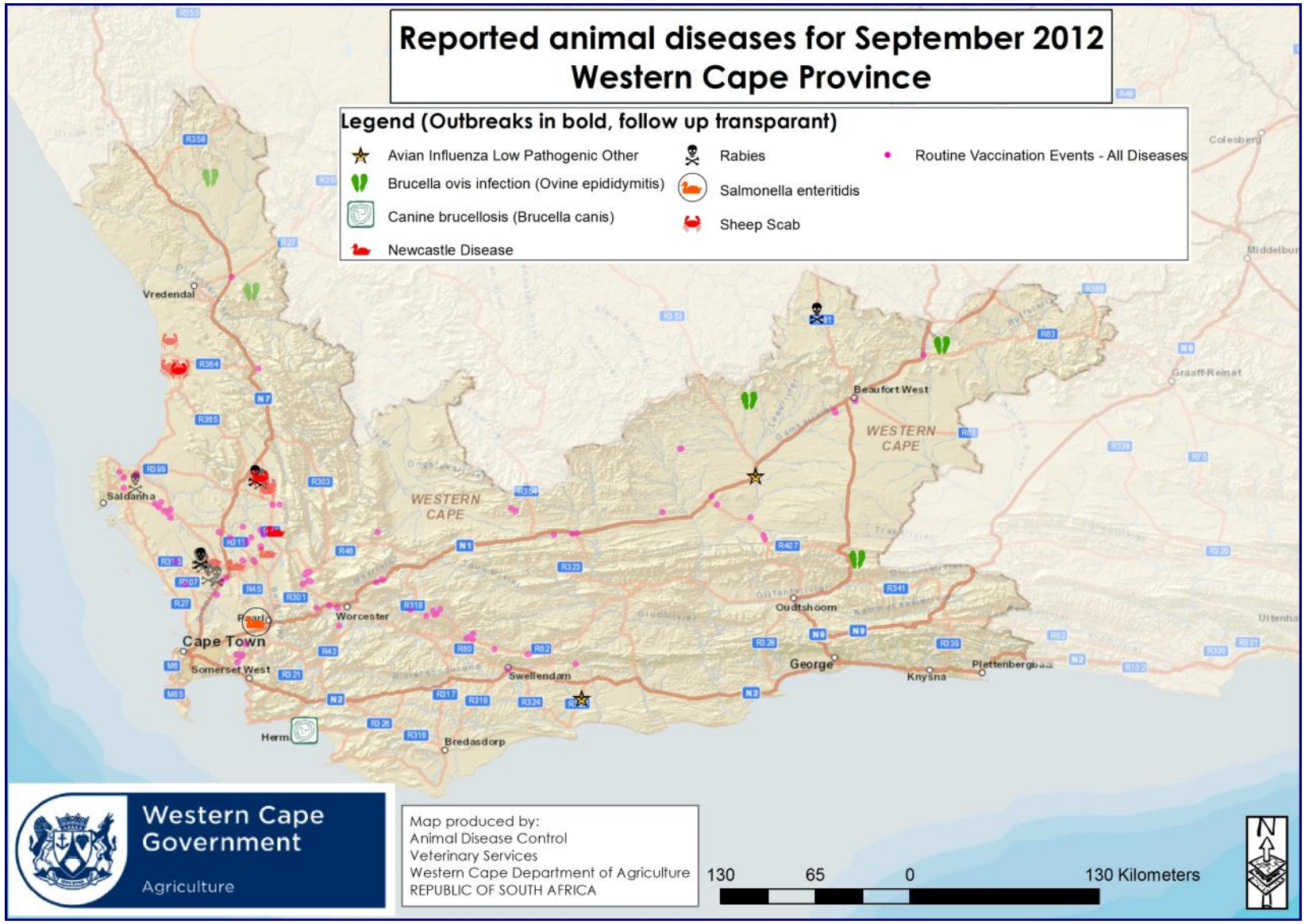
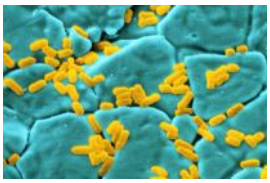


Figure 3. Disease outbreaks in the Western Cape Province identified during September 2012. Included are all the routine vaccination events (disease not specified) performed by State officials that were logged during September.



- ***Salmonella enteritidis*** has been identified on 4 **broiler** and **layer** units in the **Boland** region. The poultry affected are managed by a commercial company and all birds are vaccinated twice against salmonella with a killed vaccine. (the current outbreak has prompted a 3rd vaccination for all farms involved). A full investigation is being done by consulting vets on the farms, including expansion of testing to include all other properties in the area as well as the abattoir to try to determine the source of the infection.

Control measures put in place are listed below:

- All affected poultry will be treated with antibiotics;
- Age of layer flocks will be checked to determine feasibility of depopulating layer flocks;
- Affected broiler flocks will only be slaughtered at the end of the shift;
- Chlorine content of water at the abattoir will be increased to 150 ppm;
- Testing of final products will be done prior to release onto market;
- Meat from affected flocks will be marked and only sold on the local market. Sequence numbers of affected batches will be provided to the relevant state vet and will not be eligible for export;
- A Departmental official working at the abattoir full time has been informed of the outbreak and will monitor the slaughter and marking of bathes and cleaning and disinfection of crates/vehicles;
- The Department of Health will be informed of the outbreak.

- ***Brucella canis*** has been preliminarily identified in a dog in the **Hermanus** region on bacterial culture from a nasal swab. The dog is old female border collie with chronic upper respiratory tract blockage and discharge as well as stiffness and lameness. A more complete description of this case will be in next month's epidemiology report.
- Virulent **Newcastle** disease was diagnosed in backyard **poultry** in **Saron** with 65 of 80 susceptible animals dying. Birds showed clinical symptoms associated with the nervous system associated disease and these included paralysis and torticollis.
- Three further cases of ***B. ovis*** occurred in **Beaufort West** SV area
- 2 further cases of **low pathogenic avian influenza** have been identified, one in **Leeu Gamka** (an **H7** positive farm) and one in the **Southern Cape** (a **H5N2 confirmed LPAI**) farm.

OIE Listed Disease

SV Area	User	Total Logs
Malmesbury	Michael Chapman	56
Malmesbury	Elmien Coetzee	28
Malmesbury	Esthea Jordaan	27
Boland	Maresa Fourie	21
Beaufort West	Nita Vosloo	14
Swellendam	Eugene du Plessis	13

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Western Cape Government
Agriculture

EPIDEMIOLOGY REPORT

VETERINARY SERVICES
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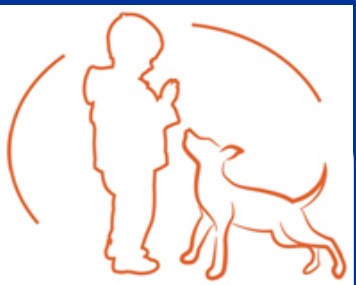
1st International Conference on Dog Population Management - LvH and AP



In September this year, two of our State Vets, Drs Pypers (Boland) and van Helden (Disease Control) attended the first ever International Conference on Dog Population Management in York, UK, due to their involvement with the Western Cape Government pet population control initiative which has begun as a sterilization pilot project in Kayamandi.

The organisers, who included the WHO, OIE, the UK government and several international animal welfare organisations, had initially anticipated a small conference, but ended up with 170 delegates from 35 countries, ranging from developed countries such as Australia, USA, Canada and Italy to developing countries like Malawi, Vietnam, Brazil, India and Nepal.

Humane, effective and sustainable dog population management (DPM) is a challenge most countries face. Dogs play an important role as companion and work animals but are also a major source of concern for the transmission of rabies and other zoonoses and for attacks on people, wildlife and livestock.

The conference provided valuable insights into the way other countries manage their dog populations. Most often, the primary motivation for governments to control dog populations is in response to cases of human rabies. Unfortunately, many countries still attempt to achieve this goal by culling free-roaming dogs , often using methods such as poisoning or shooting. It was emphasised at the conference that culling street dogs as a means of rabies control has been scientifically proven to not work and can in fact increase the incidence of human rabies cases by decreasing the pool of vaccinated dogs in the population and encouraging movement and dispersal of dogs by people not wanting their dogs to be killed. The most effective means of rabies control is mass vaccination of a dog population.

Other zoonoses, such as echinococcosus and leishmaniasis are also important, especially in developing countries. Rather than focusing solely on rabies control, a horizontal approach to zoonotic disease control can be an economical and effective one. This involves prevention or treatment of more than one zoonotic disease at a time when planning and implementing control measures.

An important issue that was raised was the participation of a community in a dog population control effort. It is extremely important to speak to the community about their attitudes towards their dog population before launching a project to control it. Many communities may be happy with the presence of free-roaming dogs and not see the point of sterilizing them. The most successful initiatives occur in areas where the community has come forward to ask an external organization for help because of perceived problems caused by the dogs. Another strong motivator for animal welfare and population control is the tourism industry, where hotel and resort owners are more likely to take an interest in their local dog population when they realize it is an area of concern for their clients.

Many new and exciting methods of non-surgical sterilization are currently being researched and/or used in various parts of the world. Gonacon is a GnRH immunocontraceptive vaccine that has been used for control of wildlife populations such as deer in the USA and is currently being tested for use in companion animals. This could have significant effect when coupled with a rabies vaccination, as a dog (or cat) could be sterilized and vaccinated simultaneously. Several other methods of non-surgical sterilization exist, but with the limitation that they can be used on male dogs

only, such as the intra-testicular injection of a calcium chloride solution, adhering to strict guidelines. Medical grade calcium chloride can be obtained very cheaply and the use of this method carries the additional advantage of sterilizing male animals while allowing them to retain their gonads, which is often more acceptable to owners who project their own gender identity onto their pet.

The need for research and publication of data in the field of dog population control was voiced by many conference delegates. There is currently no country consistently surveying dog population numbers, ownership statistics and dog population dynamics. Various methods have been used in communities where welfare organisations are active, including household surveys, vaccine use extrapolations and transects. Another neglected field is that of impact of unconfined dogs on local wildlife. Interactions between dogs and wildlife occur globally and often involve species of high conservation concern that may have devastating effects on the population. Few solutions have been proposed in the literature and this is an opportunity for collaboration between wildlife, human health and animal welfare experts.

Kevin le Roux, an animal health technician from Kwazulu-Natal, was the only South African presenter at the conference. He gave a presentation on his province's dog population and rabies control project, supported by the WHO and the Gates Foundation.

Brucella canis in the Southern Cape– LvH

Brucella canis organisms were cultured by PathCare labortaories from the nasal swab of a pet dog near Hermanus. The affected animal was an unsterilized, 15-year-old border collie bitch that had presented with blocked nasal passages, sero-sanguinous nasal discharge and dyspnea for several months. The dog was born in South Africa and had never travelled far from her home, let alone to another country.

The owners of the dog elected to have her euthanased and a large adenocarcinoma was found occluding her right nasal cavity, explaining the discharge and dyspnea. As to where the Brucella came from, no leads have been discovered. Two dogs belonging to family friends of the owners, with which the dog had frequent contact, have tested negative on their first round of blood culture testing. At least two more cultures will be performed in the coming months to try and confirm this diagnosis.

Brucella canis was first discovered in South Africa in 2005, when it was isolated from two previously stray dogs in the Western Cape, both showing signs of discospondylitis. It is highly likely that the disease is endemic in South Africa, considering that the animals from which it was isolated had all originated in South Africa, but that it is severely under-detected. We would like to encourage all vets to monitor for suspect cases. The most common signs of the disease are late abortions and reproductive failure, but all cases of the disease in South Africa up until this most recent case have been dogs with discospondylitis.

To read more about the basics of *B. canis* diagnosis and treatment, read this useful document produced by the Arizona Department of Agriculture: http://www.azdhs.gov/phs/oids/vector/brucella/pdf/BrucellaCanisQAvets.pdf

Heartworm- Dr Cathy Fox (SV George) and JDG

Summary
An adult, male, six-year-old boxer presented to a private veterinarian in Knysna in early October 2012 with an acute head tilt and malaise. A peripheral blood smear performed by the private vet showed micrifilaria present in the blood. EDTA blood samples and blood smears were sent to Pathcare in Cape Town where the presence of microfilaria was confirmed. The EDTA samples were then sent to the parasitology section Faculty of Veterinary Science at Onderstepoort where the microfilaria were confirmed to be *Dirofilaria immitis* (heartworm) based on Acid Phosphatase Staining and the DiroCHEK® test for antigen. The dog later died (between the 24th and 27th of October – it had wandered from home and drowned in a nearby dam) and during the necropsy adult heartworms were found in the dog's right atrium (see Fig. 1) and there was extensive lung damage due to the drowning and/or heartworm migration. Heartworm is an exotic disease in South Africa.

Figure 1: During the necropsy on the boxer: adult heartworms present in the heart. Lesions associated with drowning and/or heartworm migration were also noted in the lungs.

Epidemiological comments
The dog was imported into South Africa in April 2012 from the British Virgin Islands. It had undergone the required pre-import testing for heartworm (amongst other diseases). The test performed was the antigen detecting test used to identify adult worms in the animal by detecting a protein secreted by mainly the female heartworm. This test was performed on the 29 March 2012. As a result of the life cycle and the test detection limits there is a period of between 5-7 months post infection (see Fig. 2 on following page) where this test will not be positive in the face of a heartworm infected animal. This period can be longer if the animal is on macrocytic lactone preventive therapy. The British Virgin Islands have a climate that is ideal for heartworm infection and that area is endemic for the parasite. It has relatively high mean daily temperatures all year round (+-24°C) with consistent rainfall and high humidity.
Working back 7 months from the negative antigen test in March 2012 will give the most likely period of earliest infection of the animal and this period would start from the beginning of the British Virgin Islands' autumn in Sept/Oct 2011. The owners unfortunately misunderstood the requirements to continue using monthly ivermectin preventive dosages after the importation of the animal which was supposed to continue for 6 months post import. This treatment is, however, only effective against the larval stages and, at best, young adult worms until two months post infection so the likelihood of this treatment having made a difference in this case is debatable - the prophylaxis would have only made a difference if infection took place in Jan or Feb 2012 but if it took place before this (with the earliest infection defined as Sept/Oct 2011) then this treatment protocol would not have influenced the outcome in this case. The dog has fortunately remained relatively isolated since having come to South Africa. It lived on a large property with two other dogs. It was in boarding kennels in Knysna during late September/early October and is likely to have had microfilaria at this time. Fortunately the risk of transmission to contact animals at the kennels was low as the kennels were not in an urban environment and the temperatures at that time were still cold. The long term mean daily high temperature for October in that area is 21.2°C (Univ of Stellenbosch data). Considering there is a two-week extrinsic incubation period within the mosquito: any period of risk of transmission to kennelled dogs existed for the period in October after the dog had left the kennels and this was during a period when the numbers of boarders decreased significantly after the school holidays. The extrinsic incubation within the vector is highly

dependent on temperature with no incubation possible at temperatures lower than 14°C, and generally a 2 week period of 27°C+ daily temperatures are required for successful within vector incubation. The kennels are in a very sparsely populated area in the mountain in Knysna further decreasing the risk of transmission.

Control Measures implemented

Based on the unlikely presence of mosquitoes harbouring microfilaria the kennel owners where the dog boarded were asked to apply mosquito control using residual action pyrethroid sprays inside the property. Adult mosquitoes have a short life span of up to a few weeks so this control will thus continue until about the middle of Nov 2012. Of the two contact dogs on the owners property in Knysna, one will be going onto prophylactic heartworm treatment and the other has since been exported to the USA, which is heartworm endemic.

Comments

While Heartworm is an exotic disease in South Africa it has been diagnosed in Mozambique along with another filarid which would be a differential diagnosis for the presence of microfilaria in a blood smear, *Dipetalonema reconditum*.

We thanks and commend the private vet (Dr Mark Shortreed from Knysna Veterinary Clinic) who identified the presence of microfilaria on initial blood smear and who had the foresight to confirm his suspicions, particularly since this is an exotic disease in RSA. We are also grateful to Dr Schwan from the veterinary faculty at Onderstepoort for assisting the State Vet in her investigation.

References

Current Canine Guidelines for the Diagnosis, Prevention, and Management of Heartworm (*Dirofilaria immitis*) Infection in Dogs (revised January, 2012) Available online at: http://www.heartwormsociety.org/veterinary-resources/canine-guidelines.html

Schwan, E. V. & Durand, D. T., 2002, 'Canine filariosis caused by Dirofilaria immitis in Mozambique: a small survey based on the identification of microfilariae', J.S.Afr.Vet.Assoc. 73(3), 124-126.

British Virgin Islands - Wikipedia

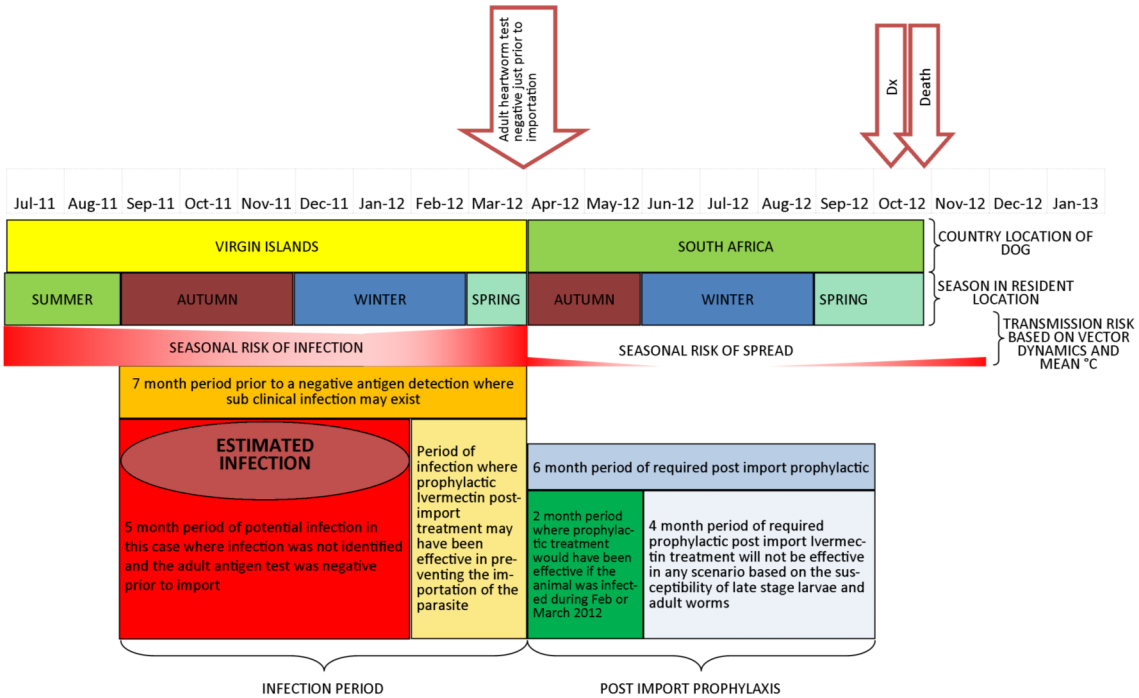


Figure 2: A schematic of the estimated period of infection for the boxer imported into South Africa. There is a period of up to 7 months during which infection occurred but would not have been identified during the pre-import testing into South Africa. The post import prophylaxis treatment protocol in place would only have been effective if the dog had been infected in the 2 months prior to being imported (bearing in mind the owners did not follow the protocol to its end). This leaves a 5 month period of potential infection which would not be picked up on testing and which would not be cleared using the standard protocol of post import prophylaxis. The seasonal risk profiles based on the mosquito vector dynamics and average temperature is shown. The Virgin islands are below the 30° North Latitude and have temperature ranges suitable for infection of heartworm throughout their year. South Africa's southern coast does not have the same range and this limits the potential for spread dramatically because of the requirements of the temperature dependant extrinsic incubation in the vector. Also note that the standard import protocol, even if followed in full, for dogs from such regions has a 5 month risk period where infection can occur and be imported in South Africa without detection or post import clearance of infection.

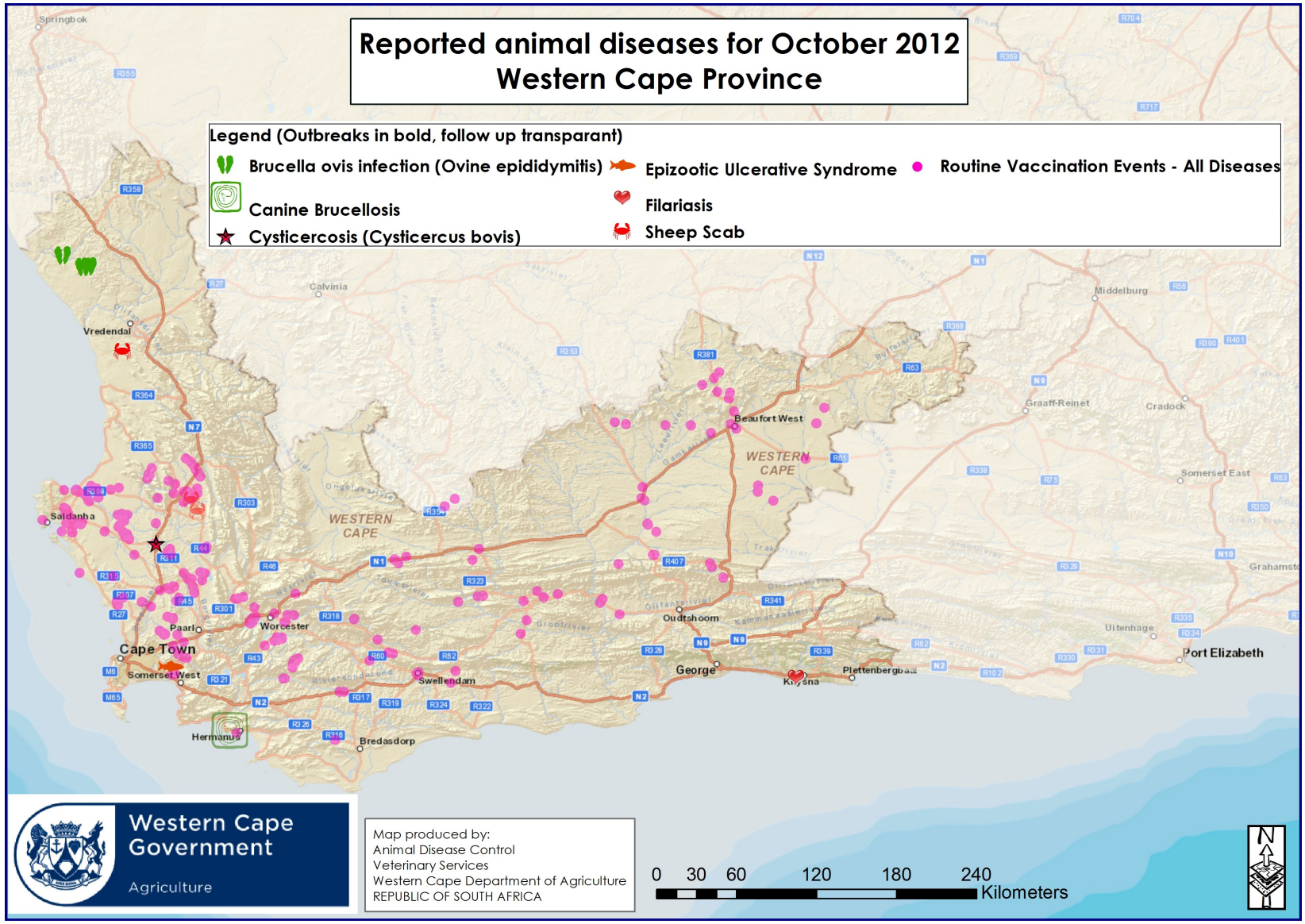


Figure 3. Disease outbreaks in the Western Cape Province identified during October 2012. Included are all the routine vaccination events (disease not specified) performed by State officials that were logged during October.

Outbreak Events

- **Heartworm** (Dirofilariasis) was diagnosed in an imported dog near **Knysna**. Please see page 3 of this report for more details
- ***Brucella ovis*** positive rams were uncovered on several sheep farms in the **Vredendal** state veterinary area. SV Vredendal continues to advise farmers to test rams every 2-3 months and cull all positive reactors.
- **Epizootic ulcerative syndrome (EUS)** made it's third appearance in the Western Cape, a mere three kilometres upstream from where it occurred a year ago in October 2011 in the **Eerste river** system. Numerous sharptooth catfish (*Clarias gariepinus*) in a dam on a wine estate were noticed dying and with large necrotic lesions on their bodies. This mass mortality was seen a few days after heavy rains in the area, which most likely triggered the disease by causing environmental stress to the fish.
- A farm on which sheep were showing signs of itching and wool loss was diagnosed positive for **sheep scab** in the **Vredendal** area.

www.nda.agric.za

Private Vet Submission

- **Suspect African horse sickness within the AHS Surveillance Zone**

A private vet submitted a horse carcass for necropsy (27th September 2012) to the Stellenbosch Provincial Laboratory after a client's horse died acutely in training in the Rondeberg area (within the AHS surveillance zone) just north of Bloubergstrand. A full necropsy was performed with organs samples taken for histopathology as well as AHS and EEV testing. PCR results from these samples returned negative AHS and EEV results from the OVI (hemi-nested PCR), Equine Research Centre and the Stellenbosch Laboratory (both real time PCR). Based on the necropsy findings, which included severe pulmonary oedema and the history of acute death during training, the lab diagnosis for this case was deemed acute heart failure. Epidemiologically it would be very unusual for an AHS or EEV case in this part of the country so early in the midge vector and disease season but it is important to confirm negative AHS cases, particularly as we head into summer.

OIE Listed Disease

SV Area	User	Total Logs
Malmesbury	Michael Chapman	100
Malmesbury	Hendrik Hagen	70
Swellendam	Eugene du Plessis	46
Beaufort West	Anton Barnard	39
Malmesbury	Esthea Jordaan	36
Malmesbury	Elmien Coetzee	20

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Western Cape Government
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EPIDEMIOLOGY REPORT

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Nov 2012
Volume 4, Issue 11

Summary stats on the avian influenza events of 2011/2012 with some time analysis

JDG

Introduction

This report will focus on three aspects of the avian influenza events of 2011 and 2012 to date. It is however very important to note that events are still ongoing, so this report is still based on some data which is preliminary and it would be wise to view it in this light. It is also important to understand that the purpose of aspects of this report is to evaluate the progression of the outbreak and the factors affecting this progression from a scientific point of view. There are many complex and abstract outbreak factors or variables which have played a role in the AI outbreak over the past 19 months. This report does evaluate certain decisions made by the Provincial government and introspection is important to improve disease control in future outbreaks. The intention of this report is not to point fingers at any one party involved in the outbreak but to understand what happened and to a degree learn something which may be helpful in future outbreaks.

The two aspects we consider in this report: a general overview of the HPAI outbreak along with the other LPAI viruses which circulated within the Western Cape and secondly an evaluation of the time it took (and the variables involved) from a positive identification of a HPAI farm (on any AI level) to the depopulation of that farm. Along with the second part is an evaluation of the time from depopulation to the time of compensation paid by Government for HPAI positive farms. I believe that this is important as it plays a role in the social approach to avian influenza and the confidence farmers have in Veterinary Services.

PART 1: General overview of events

Figure 1 below depicts those avian influenza events in the Western Cape which have occurred within the past 19

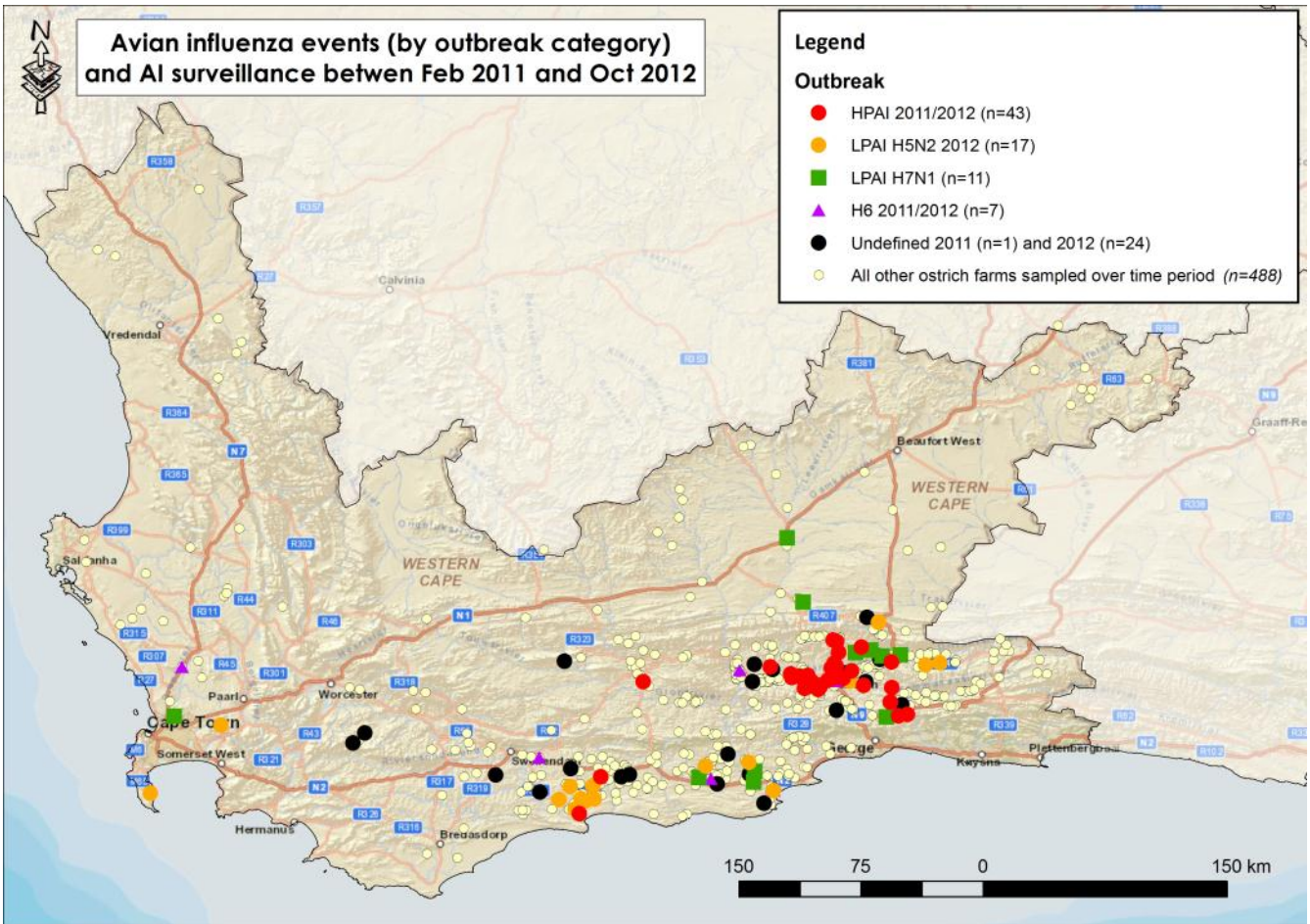

Figure 1: A spatial distribution of the farms affected by the H5N2, H7N1, H6 and undefined AI viruses identified during 2011 and 2012 in the Western Cape Province (n=99 in total). All other ostrich farms which were sampled at any point between Feb 2011 and Oct 2012 are also indicated (n=488 over and above the 99 mentioned above)

months and which are associated with the H5N2 (both LPAI and HPAI), the H7N1 (LPAI) and the H6 AI. Also depicted (in black dots) are the undefined AI events where the only available testing data points to an AI virus of unknown H or N type - so these are cases with positive ELISA and/or matrix gene PCR results and importantly which cannot be linked to another AI category based on epidemiological links. Spatially you get the impression of 4 areas of concern: the Klein Karoo valley where the majority of HPAI cases occurred; the Southern Cape in two foci near Mosselbay and Heidelberg and then some events within the Boland region.

The absolute majority of HPAI events occurred in the Klein Karoo Valley within the AICA (AI Control Area). Three HPAI events occurred outside the AICA, two of which were HPAI PCR positive and one on H5 serology with tracing links to a positive farm in the AICA.

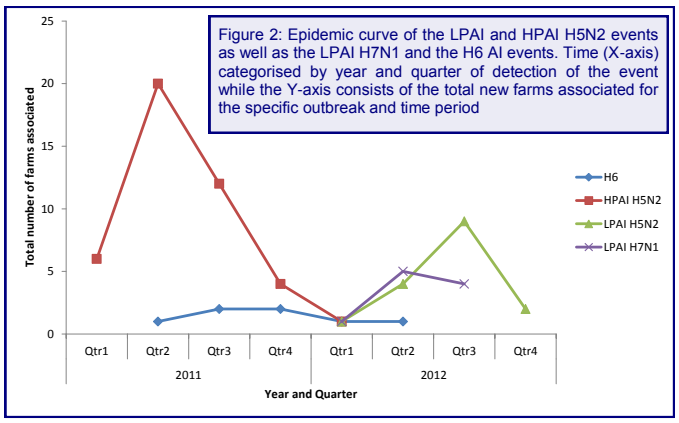

Figure 2: Epidemic curve of the LPAI and HPAI H5N2 events as well as the LPAI H7N1 and the H6 AI events. Time (X-axis) categorised by year and quarter of detection of the event while the Y-axis consists of the total new farms associated for the specific outbreak and time period

Figure 2 above depicts the epidemic curves of the LPAI and HPAI H5N2 events as well as the LPAI H7N1 and the H6 AI events. The majority of the HPAI events occurred in the winter of 2011 with five cases detected in the summer of 2011/2012, only one of which was positive on any form of PCR - see Figure 3. Figure 3 is important that it shows, from a general and subjective impression that, as you would expect on a farm level, the PCR positives drop off sharply with lagging serology positives.

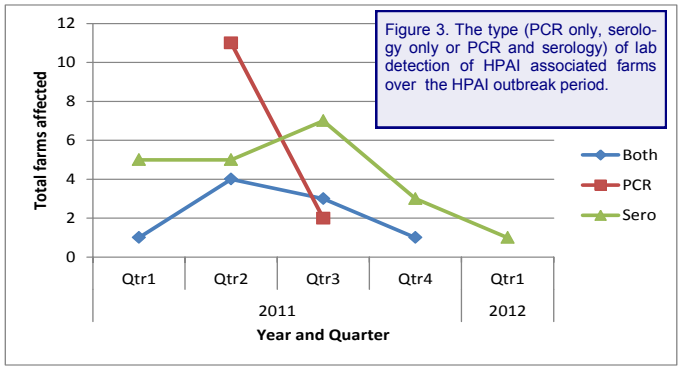

Figure 3. The type (PCR only, serology only or PCR and serology) of lab detection of HPAI associated farms over the HPAI outbreak period.

SURVEILLANCE

Figure 4 shows the surveillance effort for the Western Cape Province over the past 22 months. The Y axis indicates the number of unique farms sampled for that month, so note that on some farms more than 1 sampling event may have taken place. It is quite evident how the surveillance effort increased after the HPAI outbreak had been diagnosed.

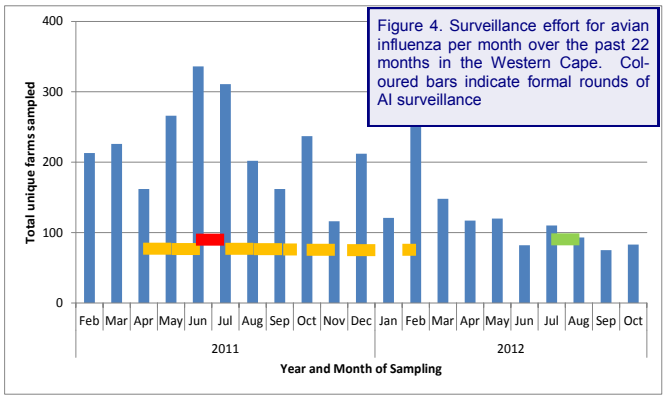

Figure 4. Surveillance effort for avian influenza per month over the past 22 months in the Western Cape. Coloured bars indicate formal rounds of AI surveillance

The highest number of farms sampled per month was at its maximum level in May, June and July 2011, during month 2, 3 and 4 of the outbreak. The coloured bars indicate specific, targeted surveillance efforts by the Province. The orange bars ( ) indicate the AICA (AI control area - Klein Karoo) surveillance, with a total of 8 rounds of surveillance, the final two in Dec 2011 and Feb 2012 being negative. The red bar ( ) indicates the Provincial level zoning surveillance where a randomised survey was done to see whether there was AI outside of the AICA. This round of surveillance was the one that detected the first HPAI event outside the AICA. The green bar ( )indicates the first round of surveillance within the Southern Cape AICA. Further rounds have not been performed on a formal level in this area - this was based on the retraction (Oct 2012) of the HPAI results from the initially diagnosed HPAI farms which were identified in June and July 2012.

The total number of unique ostrich farms sampled for AI over the past 22 months totals 587 properties. On average we have tested 173 unique properties per month which accounts at any given month for 30% of the active farms in the Province. During the most busy surveillance month (June 2011) over 55% of farms in the Province were tested.

PART 2A: DEPOPULATION

The variables associated with depopulation are complex, and include legislative, scientific, social and economic aspects of decision making. The following three graphs must be looked at together. This is an analysis of the time taken (in weeks) between when a farm was first detected AI positive to when it was depopulated.

NB: Please note that date of first detection includes both AI detection on matrix gene PCR and ELISA or H5 HI serological testing. For instance: 16 of the 43 farms

associated with the HPAI outbreak were confirmed on sequencing to be HPAI. The rest were based on epidemiological links to the outbreak and serology results indicating a likelihood of having being infected with HPAI virus. In fact, as is evident in Figure 3, only 9 of the 43 farms were found positive on both serology and PCR. The point therefore of this analysis is not to look at the reaction time of officials to slaughter out positive farms, but rather to focus on issues that influenced a decision to slaughter out and the possible consequences of those issues in terms of the outbreak.

Figure 5a: This shows the overall HPAI outbreak in terms of

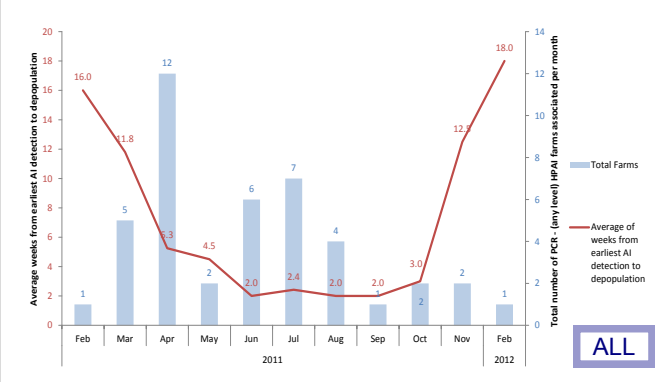

Figure 5a: The average time taken (in weeks) between AI (any level) detection and depopulation of that farm. This data represents all farms associated with the HPAI outbreak.

slaughter out time after detection. The farms have been categorised into the month and year they were detected and the count of farms within that month is represented by the blue bar graph. The red line then indicates the average number of weeks taken for farms detected positive in that month to when they were depopulated as per legislation. It is immediately obvious that a certain pattern unfolded within the outbreak. Initial time taken to slaughter out was slow with none of the first 18 farms detected being slaughtered out under an average of 6 weeks after detection. However as the outbreak progressed the time period to slaughter flattened out with < 5 weeks in May and then <2.5 weeks from June to September 2011. Suddenly however there is again a steep rise in time taken to slaughter for the final three farms to be detected. There are two major reasons for the initial and final long period to slaughter.

Initial lag phase

The first farms to be associated with the outbreak after HPAI was confirmed in April 2011 were 5 farms which were at that stage seropositive on an H5 level only. The Western Cape has experienced this before, most recently in the winter of 2010 when a number of farms tested seropositive in the Southern Cape for H5 AI - see the Western Cape Epidemiology Report - Vol 2, Issue 9 - http://www.elsenburg.com/vetepi/epireport pdf/September2010.pdf for the report on these occurrences. This event in 2010 definitely influenced the hesitance to slaughter the seropositive farms in Oudtshoorn, as there was no evidence of circulating virus on follow-up tests. The distinct difference in approach to slaughter of seropositive only and PCR positive AI farms is clearly evident in Figures 5b and 5c. The lag period under review is circled in dashes. The PCR positive farms (Fig. 5c) were slaughtered out relatively quickly from the start of the outbreak with average times taken starting at 7 weeks and dropping to 2 weeks in June and July 2011. The difference in serology positive only farms is evident in Figure 5b, where it took 3

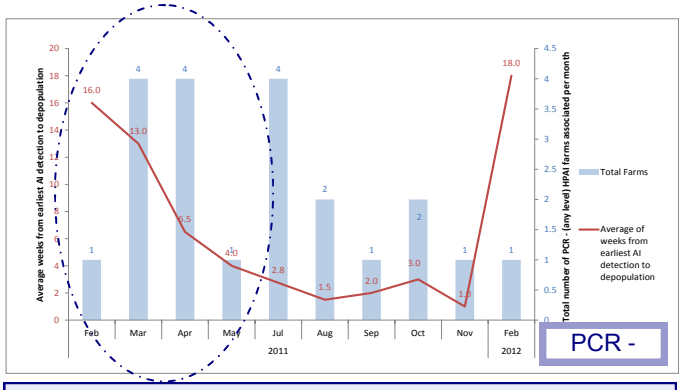

Figure 5b: The average time taken (in weeks) between AI (any level) detection and depopulation of that farm. This data represents only farms that were **PCR negative** during the HPAI outbreak.

months to get the average time down to 4 weeks after detection and then the curve flattens out somewhat.

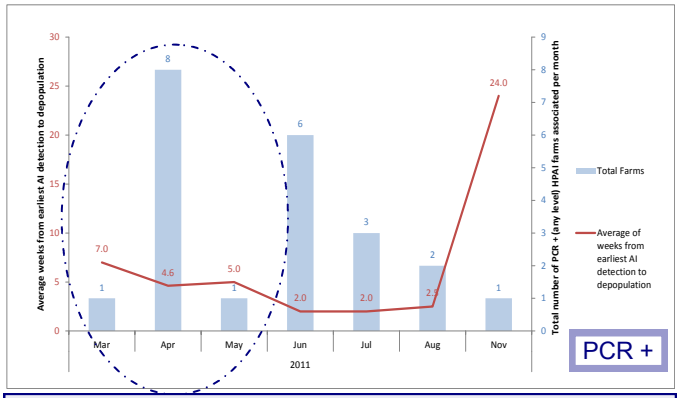

Figure 5c: The average time taken (in weeks) between AI (any level) detection and depopulation of that farm. This data represents only farms that were **PCR positive** during the HPAI outbreak.

Final lag phase

The final increase in time to slaughter is based on one major factor - individual farms in this time period were detected positive outside of the AICA and their results were difficult to interpret and the farms not convincingly linked to the HPAI outbreak. One farm was a PCR positive farm but it was only confirmed HPAI in Feb 2012 and initial detection was on the m-gene PCR - see Compensation section below. The other farm was a seropositive farm detected in Feb 2012 in the Southern Cape. It did have tracing links to a HPAI positive farm in the Oudtshoorn district but had been tested negative on serology multiple times since the movement of birds in early 2011.

DEPOPULATION CONCLUSIONS

There are reasons why depopulation was performed at the average time it was in this outbreak.

SOCIAL

- Initial difficulty of convincing role-players of the validity of lab results
- Contractual negotiations with farmers of farms to be depopulated were often difficult and lengthy to conclude

EPIDEMIOLOGICAL

- Difficulty in confirming that seropositive farms were part of the HPAI outbreak
- Maintaining a consistent case definition for HPAI farms
- Difficulties in linking positive farms to one another with an absence of corroborating epidemiological evidence - particularly between the AICA and outside the AICA
- Historical inability of sampling to detect active virus infections in ostriches
- Lack of clinical signs of AI in ostriches which would assist in making a diagnosis on a farm level

SLAUGHTER LOGISTICS

- Transport to abattoir for slaughter of positive farms required time to implement as standard transport protocols did not suffice - for example trucks needed to be covered with netting to prevent feather dispersal
- Abattoir rendering facilities were overloaded at times and there was down-time due to maintenance

ECONOMICAL

- Economic impact of slaughtering breeder birds on seropositive farms
- Lengthy debate as to the validity of slaughtering sero -positive only farms for compensation

LABORATORY

- Lag phase between m-gene/H5 PCR result and the HPAI confirmation on sequencing
- A lack of AIV isolation positive results
- Initial lab capacity constraints as a result of other controlled disease outbreaks running concurrently - AHS and RVF as examples

Irrespective of the reasons for the time period to slaughter out its is clear that there were occasions when depopulation was too slow which made this control measure impotent. There were examples of farms where seroconversion had occurred throughout the flock and no circulation of virus was evident and then depopulation occurred after this event. Much has been said in the past few months about changing strategies to avian influenza but it is important to realise that the strategies that are in place are used successfully in other parts of the world and it is a question of implementation rather than effectivity which must be considered.

The ostrich industry is set up differently to the poultry industry and there is no doubt that the classification of ostriches as poultry influences the practicality of certain outbreak control measures. The incubation period of avian influenza is variable, ranging from hours to 2-3 days for HPAI. This period is influenced by species affected and the OIE uses 21 days as an incubation period for regulatory reasons. Either way, the depopulation of infected flocks needs to occur as soon as possible after detection for this to be effective

PART 2B: COMPENSATION

Over the past 19 months almost 50 million rand of compensation has been paid to farmers who depopulated as a result of the HPAI virus (this is the direct payment made based on ostriches slaughtered and does not include other costs associated with the outbreak). Of the 43 farms affected, compensation by Government was paid to 41 farms. Of the 2 remaining farms one was slaughtered out for local consumption after conclusive evidence of no circulating virus was found. This occurred after sequencing confirming HPAI was only received in late February 2012, almost 4 months after the initial m-gene positive PCR result. The other farm where compensation was not paid was a positive farm outside of the AI control area in Oudtshoorn, and in this case ostriches were slaughtered and meat rendered by the ostrich industry themselves.

One of the factors which drives the slaughter out of farms is the farmer's perceived risk of either not being paid by Government for slaughtering of positive properties or that payment will take longer than what is acceptable in his/her opinion. The average number of weeks it took from date of depopulation to date of payment for the entire outbreak was 5.5 weeks. There is one factor to consider in this though. For the initial phase of the outbreak (the initial 38 of the 41 farms compensated) the money was paid directly from the Provincial budget and was later claimed from the National budget. However, once funds on a Provincial level could no longer be made available for these payments, compensation was directly claimed from the National department. The average weeks from depopulation to payment for the Provincial phase was 4.7 weeks while the National phase (final 3 farms) was 16 weeks. This is a factor that must be addressed should compensation be payable in future - for the farmers that waited the 16 weeks to payment from depopulation there was a lot more financial and emotional stress for this time period. This stress was transferred onto Veterinary officials in the field. The major reason for the difference in time taken to payment between Provincial and National level is that on the Provincial level the initial funds were available on the Departmental level and after payment to farmers a request for reimbursement to the National Department could be made. The National Department, however, needed to make a formal application, via Parliament, for funds required to pay compensation, and this process is a lot more time-intensive.

(eds note: We have seen similar circumstances with the compensation of 4 of the LPAI H5N2 farms slaughtered out in 2012 - this compensation is claimed on the National level and thus far no farms have been paid. The average wait for the farmers, as of 3 Dec 2012, has been 24.75 weeks with a maximum wait time of 36 weeks for a farm slaughtered out in March 2012).

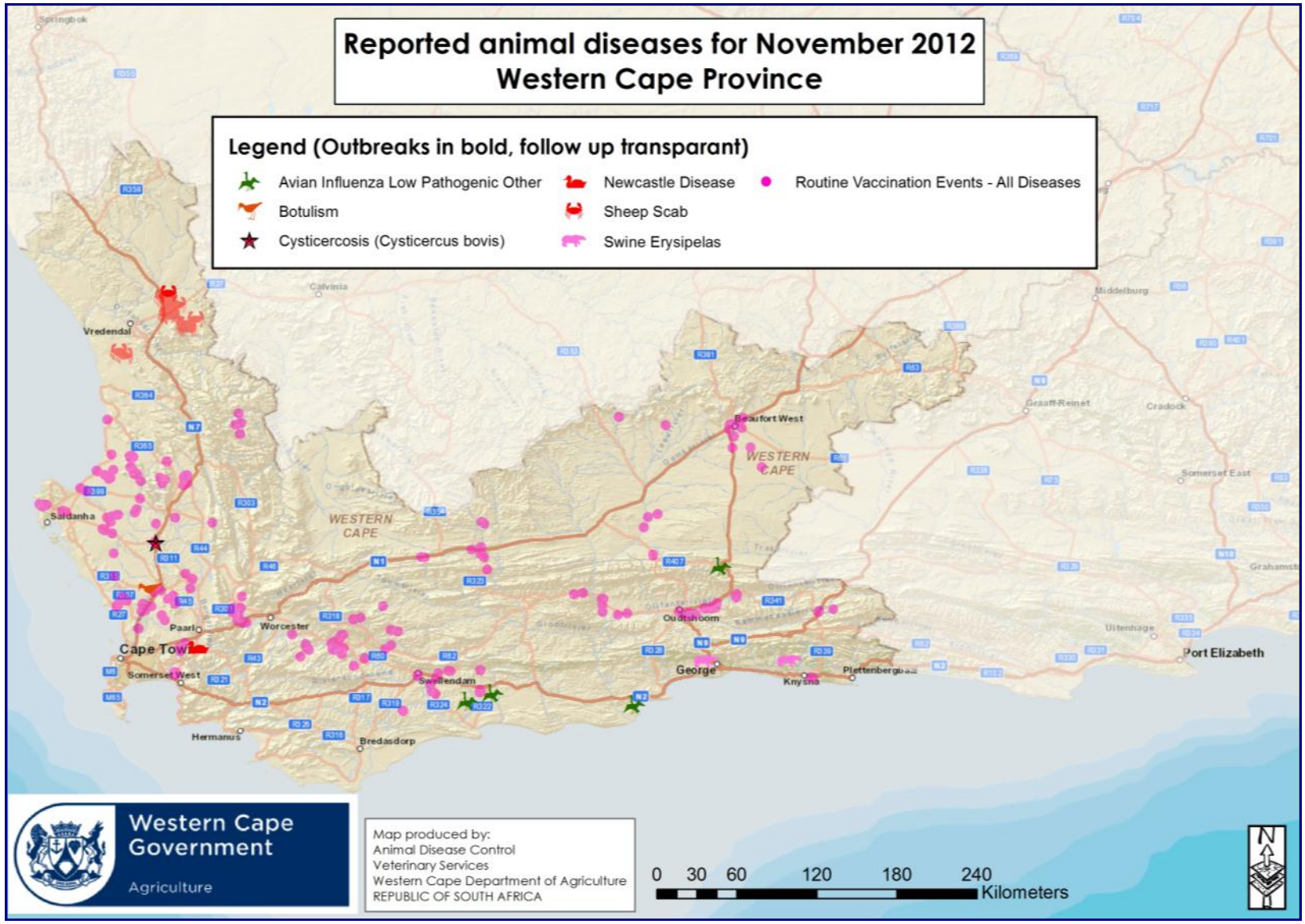

Figure 6. Disease outbreaks in the Western Cape Province identified during October 2012. Included are all the routine vaccination events (disease not specified) performed by State officials that were logged during November. Note that the AI events depicted are categorised in the current LPAI H5N2 outbreak and these events, although logged in November, occurred in Aug (n=1), Sept (n=2) and Oct (n=1).

Outbreak Events

- A ***B. abortus*** positive dairy farm near **Ladismith** has had its quarantine lifted after multiple rounds of negative testing with slaughtering of the originally positive animal.
- An outbreak of **Newcastle** disease occurred in a **broiler** house on a regularly vaccinated farm in the **Simondium** area. No other houses have been affected on the property. The farm has been placed under quarantine. Manure will be composted on the farm and once symptoms have subsided and mortalities returned to normal the remaining chickens will be slaughtered out. Follow up NCD vaccinations have been completed. Neighbouring poultry farms have been informed and inspected but remain unaffected.
- Two cases of **swine erysipelas** have been found in the **George** area. In the first case signs of swine erysipelas were detected by a private veterinarian during meat inspection at an abattoir in George, although no other cases were found after inspection of the farm of origin (near **Blanco**) was carried out. Another case was detected in **Rheenendal** (near Knysna) when several pigs with swine erysipelas symptoms were diagnosed by a private veterinarian on the farm. It is a fattener/feedlot type farm with multiple sources of young pigs. Treatment was initiated but 11 deaths still occurred with a mortality rate of 2.6% and a prevalence of 4% (population at risk of 422 animals). A vaccination program was initiated on the farm.
- Two outbreaks of **sheep scab** have been reported from the **Vredendal** state vet office. The first was detected clinically by the farmer and confirmed on microscopy by the State Vet. The farm had an outbreak of sheep scab earlier this year which was resolved under official supervision at the time. The other case occurred near **Vanrhynsdorp** in a farmer's rams. A clinical diagnosis was made and confirmed on microscopy. The rams were separated from the rest of the unaffected flock with no contact allowed with other sheep. In both cases the affected farm and in contact farms were quarantined and sheep were treated under official supervision.
- State vet Malmesbury along with a private vet colleague examined and diagnosed three **wild water birds** with **botulism** based on clinical signs, history and a negative PM. The birds affected were a **duck**, a **sand piper** and a **sacred ibis**. There was insufficient gastro intestinal content to take samples for toxicology.

OIE Listed Disease

SV Area	User	Total Logs
Malmesbury	Michael Chapman	89
Malmesbury	Hendrik Hagen	81
Swellendam	Magrietha van Wyk	45
George	Attie Erasmus	44
Malmesbury	Esthea Jordaan	43
Vredendal	Jacques Kotze	34

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Western Cape Government
Agriculture

EPIDEMIOLOGY REPORT

VETERINARY SERVICES
Dec 2012
Volume 4, Issue 12

2012 Twenty Year Review in Twelve

DISEASES

2012 has been a busy year for the Epidemiology subsection of the Animal Health sub-directorate. The persistence of the **Avian Influenza** events have continued to put pressure on the section in terms of data analysis and capture, and the variety of AI viruses which circulated during the year made every event unique and thus much effort was required during their investigations. During 2012 we developed a AI flow diagram to assist State Vets in their decision making process. We also did this to attempt to approach the H5 and H7 viruses uniquely compared to the other LPAI viruses. The section also developed an AI investigation template which allows for standardised investigations to be performed by both State Vets and technicians. This has also helped to standardise data coming into the Epi section. For a more in depth analysis of the 2012 AI events please refer to the Nov 2012 Epi report.

Other poultry events of significance has been the continued **Newcastle** and **Salmonella** disease outbreaks in broiler and layer units in the Swartland (Fig 1A). **Botulism** was suspected in wild birds, also in the Swartland.

Sheep scab and ***Brucella ovis*** (**ovine epididymitis**) (Fig 1b) continued to be highly prevalent in the Western Cape sheep farming regions. A total of 21 outbreaks of scab occurred in the Vredendal, Malmesbury, Southern Cape and Karoo regions. Officials supervised the treatment of over 80 000 sheep and goats in response to these outbreaks during the year. 24 outbreaks of *B. ovis* were reported with by far the majority in the Beaufort West region and the balance originating in the Vredendal area. Over and above these two diseases other diseases affecting sheep which were reported included 5 cases of **Johne's** disease and 2 cases of **Bluetongue**.

Figure 1c and d on the following page shows the less common diseases reported in other species in the Province. The **rabies** is discussed on the page 3 of this report but other diseases of interest which re-occurred in the Province was **swine erysipelas** in the George region and another confirmed outbreak of **EUS** in catfish in the Eerste river system near Stellenbosch.

In terms of companion animals we had the two interesting cases in dogs this year, both of them being relatively exotic diseases. The case of **heartworm** in the imported dog in Knysna is a first in the Province to the best of our knowledge while, although it has been seen before in the Province, the **canine brucellosis** diagnosed in Hermanus was also something new for us. The brucellosis case led to the formulation, by Dr van Helden, of an SOP for the management of these events in future. The **dourine** discovered in a Mule near Elim was also new for the current members of the Epi section.

Vaccinations by the State were by far mostly made up by routine rabies vaccinations. Other diseases targeted most were Rift valley fever, Newcastle disease, ovine and caprine enterotoxaemia and then anthrax.

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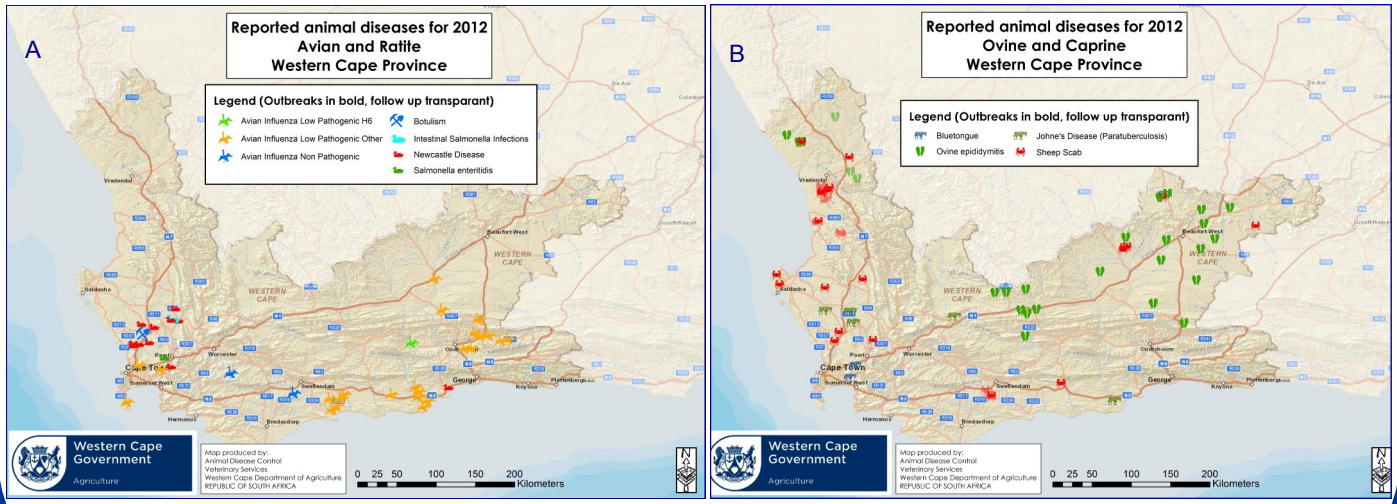


Figure 1 a and b: Maps indicating the disease outbreaks experienced for the various species of animal in the Western Cape Province during the 2012 calendar year.

EDUCATION

2012 has also, along with its challenges, been a year where the members of the Epi section have been exposed to training in epidemiology both in South Africa and abroad. Dr Grewar attended the Avian influenza symposium in the UK in March and was hosted by SASVEPM at the International Symposium of Veterinary Epidemiology and Economics in Maastricht, Netherlands in September. Dr van Helden also attended (and did an oral presentation) at ISVEE and attended the 1st International Conference on Dog Population Management later in the year in the UK.

Both Dr Grewar and Dr van Helden attended and presented at the SASVEPM congress in Pretoria in August. They also facilitated the 2 day pre-congress workshop.

PROJECTS

Over and above the day to day reporting on animal diseases the Epi section has also been involved in a number of stand alone projects within the Department of Agriculture and also in collaboration with DAFF and overseas colleagues.

Dr van Helden has been instrumental in the management and planning of the sterilisation and census projects in Kayamandi and Klapmuts in the Boland region. Data generated from these projects will be presented in future Epi reports.

The once off FMD survey co-ordinated by DAFF was also managed by the Epi section who did the Provincial level co-ordination. The FMD survey was part of the greater OIE freedom application for this disease for South Africa.

A dossier to apply for OIE African horse sickness freedom status was also partly compiled by the Epi section as the AHS free zone is in the Western Cape. This was a large project and required coordination with DAFF and the equine industry. An answer to the request will be announced next year.

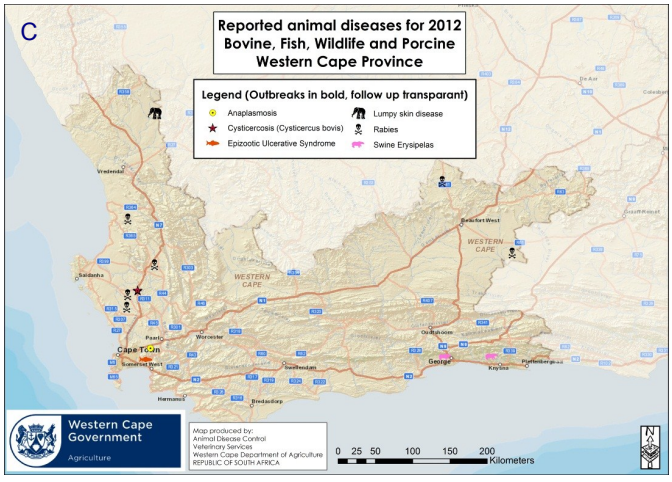
PLANS FOR 2013

The Smartpen technology has been in use by the Department of Agriculture for some time now and during 2013 it is almost certain that this will be put into use by the Animal Health Technicians within Veterinary Services as well. This technology simplifies data capture and improves data integrity and should make it easier to capture, store and analyse data coming in from the field. Initially this will be used by the technicians to capture the census data they are currently capturing on our CADIS system and if all goes according to plan CADIS will be replaced by the Smartpen system. The Epi section's purpose in the process will be to ensure that the data we require for analysing animal populations is available in a format we can use. We may also be involved to a degree in the validation of census data.

Upgrades to our OIE listed disease data capture (disease outbreaks, follow ups and vaccinations) system were made during 2012 with a few added features increasing the user friendliness of the system and the power of the analysis possible online. From the outset we envisioned the OIE system being used by private veterinarians as well in order to get a complete a picture as possible of the disease outbreaks and prevention within the Province. Hopefully in 2013 we can pilot the system with some of our private colleagues and see if it can be used to both their and the State's advantage.

Expansion of the information available to the State Veterinarians and Animal Health Technicians on the vetepi website have been ongoing and in 2013 this will be a focus of the Epi section team, disease outbreaks notwithstanding.

In terms of disease surveillance the only aspect that is being revised currently is the formal CSF and PRRS surveillance in pigs which is stopping. We envision a more clinical surveillance type system which will replace this. AI surveillance will continue and the new VPN for ostrich farming makes it a more intensive system with both pre and post movement surveillance.



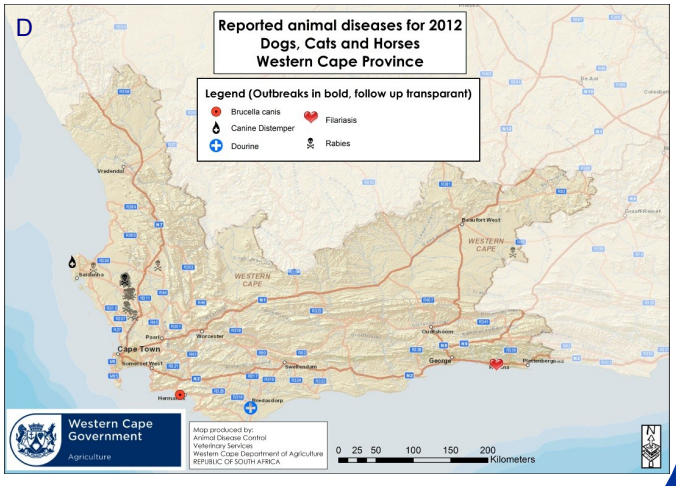


Figure 1 c and d: Maps indicating the disease outbreaks experienced for the various species of animal in the Western Cape Province during the 2012 calendar year.

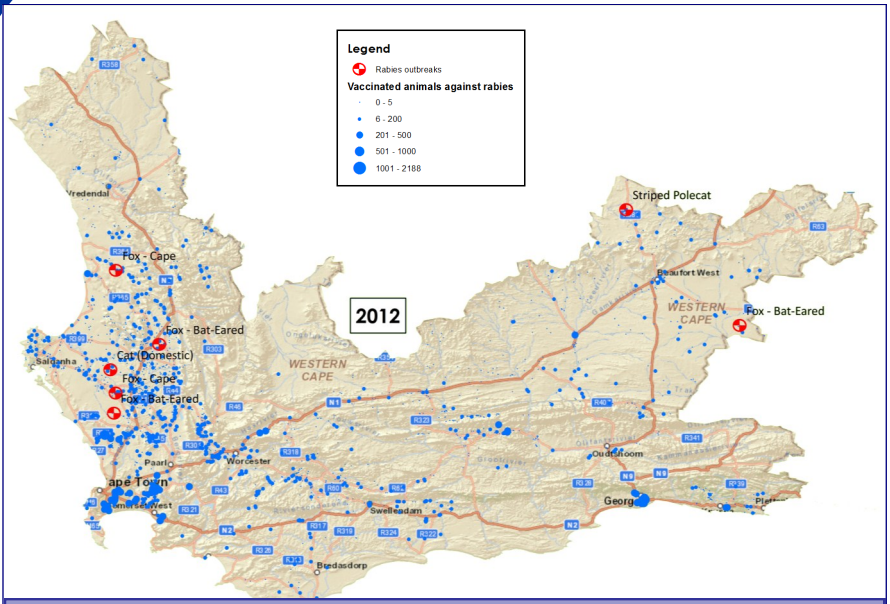
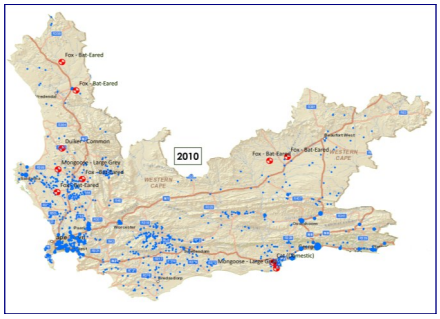
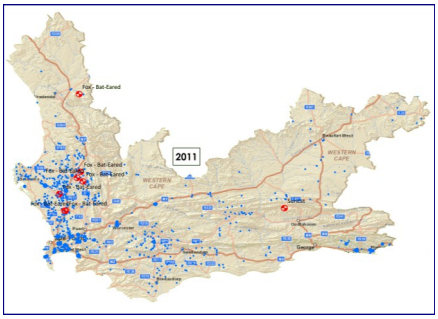


Figure 2: Rabies vaccination and outbreak data year on year: 2010 - 2012.





Rabies

As always Rabies deserves a bit more of an intensive look as it is one of the primary diseases which the Animal Health sub directorate targets in terms of disease control. Figure 2 shows the progression of the rabies vaccination effort logged by Western Cape Veterinary Services over the past 3 years. Included on the map are the outbreaks we have experienced over that time and the species those outbreaks occurred in.

In 2012 we had our first case of rabies in a domestic cat since the Mossel Bay rabid cat in 2010. Other than that the trend of rabies outbreaks has remained very constant over the 3 years, with the majority of cases occurring in Bat eared foxes in the Malmesbury State Vet region. There were however 2 cases of Cape fox associated rabies this year which hasn't been evident over the past few years and the case in the striped polecat in Beaufort West also shows some spill over from the Bat eared fox host in the Western Cape.

The number of rabies outbreaks experienced in the Western Cape has decreased. There were 10 cases in 2010, eight cases in 2011 and had only seven cases in 2012. The number of outbreak response vaccinations concur with this trend as in 2012 the State only performed 176 vaccinations in response to outbreaks, this compared to 1651 in this category in 2010. The number of routine rabies vaccination events logged by technicians has reached its highest year on year total in 2012 with 3999 events logged totalling 50 512 vaccinations (average per event was 13 vaccinations; median was 3 vaccinations per log). Compared to 76 668 routine vaccinations performed in 2948 events in 2010 (average per event was 26 vaccinations; median was 4 vaccinations per log) it can be seen that technicians are either spatially more accurate when logging their data or there is an increase of doing smaller quantities of vaccination in more areas. Whichever is true is a good trend in terms of coverage and accuracy of data, although as discussed in last year's rabies review, it is still important to continue with the vaccination campaigns with large quantities vaccinated in few areas to cover the more densely populated areas thoroughly.

Not much has changed in the areas covered by vaccination in the Western Cape. Subjectively there is an impression that the avian influenza events of the past year and a half may have influenced the Southern Cape rabies vaccination effort. This area must be focussed on as soon as is logistically possible in order to decrease the susceptible population of animals in this area. The continued dedication of the Malmesbury State officials is, in my opinion, having a significant impact on the number of cases of spill over rabies from the bat-eared fox population in the Swartland. Based on the outbreaks in wildlife in that area the pressure for spill over is at its peak in this part of the Province. "*Prevention is better than cure*" is especially true for human cases of rabies and it would not be an exaggeration to say that the effort by the officials in this area has saved human lives.

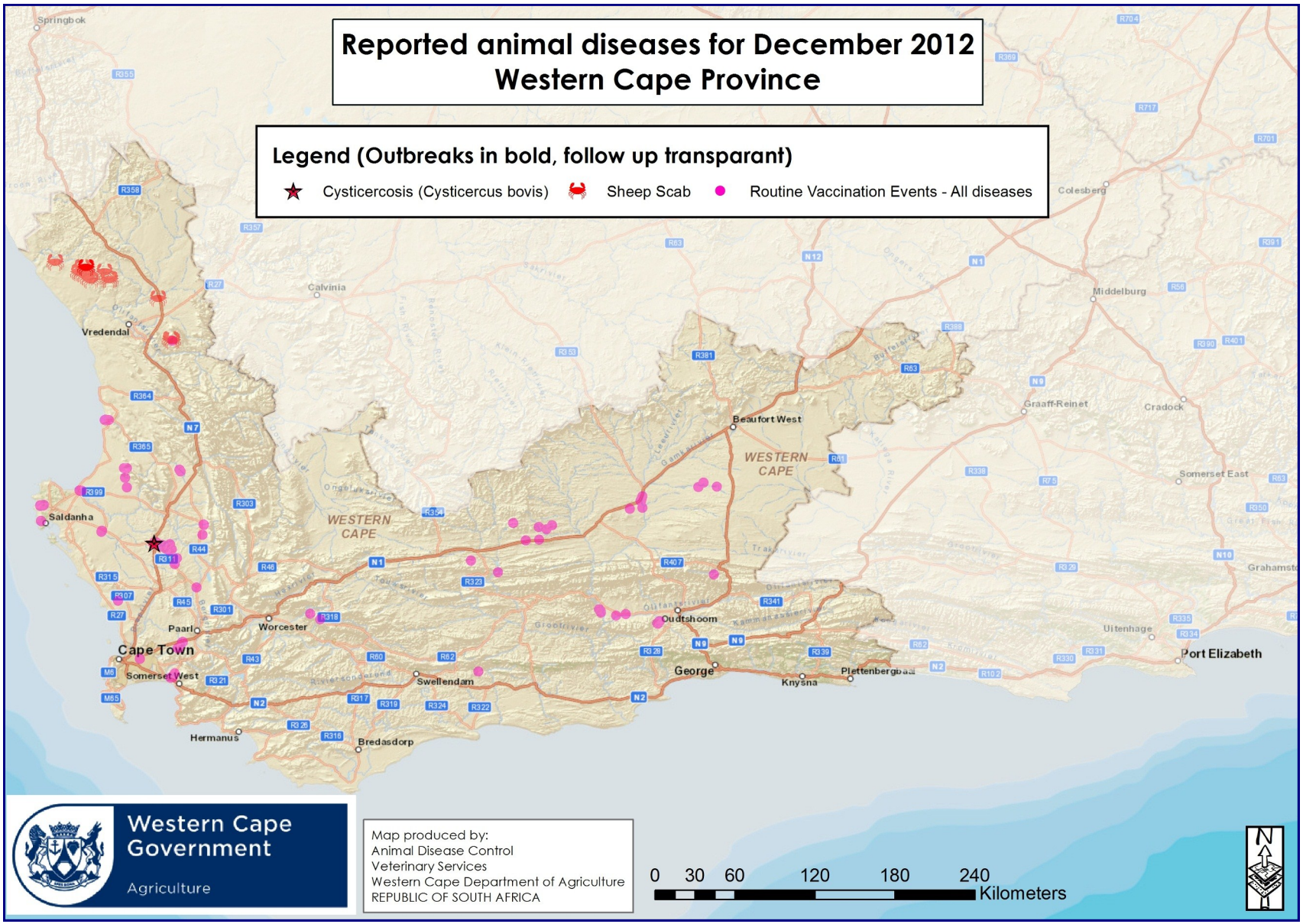


Figure 3. Disease outbreaks in the Western Cape Province identified during December 2012.

2012 Twenty Year Review in Twelve

Logging OIE Events

This edition of the Epidemiology Report has focussed enough on diseases so in place of the standard back page outbreaks, of which there was nothing interesting for December, we though it appropriate to celebrate the efforts of the Animal Health Technicians who have done an excellent job in logging the routine vaccinations, the outbreak follow up events and the outbreaks which make this report possible. Over the past 3 years the effort that has been made by them has increased to a point where the data is solid enough to be making real analysis possible and which will hopefully impact the animal health status of the Province.

The top 3 event loggers this year again came from the Malmesbury State Vet office! See the picture above where they received a small token from us for their hard work. Michael Chapman and Hendrik Hagen were neck and neck this year with Michael (697 logs) pipping Hendrik (680 logs) to the post. Although Esthea had 'only' 337 events logged this was still far above the next best of 250 logs! The top event loggers per area for the other SV regions was Irmi Speelman (SV Vredendal - 250 logs), Anton Barnard (SV Beaufort West - 241 logs), Maresa Fourie (SV Boland - 144 logs), Johan Botha (SV George - 124 logs) and Magrietha van Wyk (SV Swellendam - 167 logs). Special mention must also go to Elmien Coetzee and Nita Vosloo from SV Malmesbury and SV Beaufort West respectively who significantly increased their events logged this year even though they are in quite challenging areas in terms of potential animals to vaccinate.

OIE Listed Diseases logged

TOP 6 2012

SV Area	User	Total Logs
Malmesbury	Michael Chapman	697
Malmesbury	Hendrik Hagen	680
Malmesbury	Esthea Russouw	337
Vredendal	Irmi Speelman	250
Beaufort West	Anton Barnard	241
Malmesbury	Elmien Coetzee	232

TOP 6 December

SV Area	User	Total Logs
Malmesbury	Michael Chapman	47
Malmesbury	Hendrik Hagen	38
Vredendal	Ryan Turner	17
Boland	Maresa Fourie	13
George	Attie Erasmus	13

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