



Canadian Food Inspection Agency SCIENCE SCAN



BACKGROUND: The Science Scan was developed by the CFIA's Science Strategies Directorate as a mechanism to highlight, raise awareness and share significant new information from open sources related to animal and plant health, such as information on new, emerging or re-emerging pathogens or pests.

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PLANT HEALTH ARTICLES

1) Foliar Fungicides to Control Wheat Stem Rust, Race TTKS (Ug99), in Kenya

Source: Wanyera, R., J. K. Macharia, S. M. Kilonzo and J. W. Kamundia. 2009. Foliar Fungicides to Control Wheat Stem Rust, Race TTKS (Ug99), in Kenya. *Plant Disease*, Vol. 93:929-932.

The emergence of a new virulent race of stem rust (*Puccinia graminis* f. sp. *tritici*) of wheat (*Triticum aestivum*), TTKS (Ug99), poses a serious threat to wheat production in Kenya (and to wheat production worldwide) and calls for urgent measures to contain the disease. In this study, nine commercial fungicides were evaluated for control of stem rust in the field. Results indicated that fungicides such as azoxystrobin (at 200 g/liter) + cyproconazole (at 80 g/liter) (AmistarXtra 280 SC), tebuconazole (Folicur 250 EC), tebuconazole + tridimenol (Silvacur 250 EC), and tebuconazole (Orion 25 EW) can significantly reduce rust severity, losses in grain yield and 1,000-kernel weight (standard measurement of the weight in grams of 1000 seeds of a seed sample).

Comments: Researchers worldwide are urgently attempting to develop genetic resistance to this new emerging race of stem rust. The results from this research show that fungicides could be used to effectively reduce stem rust severity and increase yields of susceptible wheat cultivars in stem-rust-prone areas. As it could be many years before resistance is successfully deployed in commercial cultivars, fungicides may be a valuable asset. However, fungicides may have environmental and economic concerns, so the development of host resistance is always a preferred option.

2) Blueberry Shock and Blueberry Scorch Viruses Identified in Michigan (First Report)

Sources: New Blueberry Plant Diseases Confirmed in Michigan State, university officials working to rapidly protect Michigan blueberry industry. Compiled by staff. Published: July 31, 2009. Michigan Farmer
(<http://michiganfarmer.com/story.aspx?s=25239&c=9>).

D.N. Goodman (Associated Press Writer), August 31, 2009. 2 viruses threaten Michigan blueberry industry; scientists forced to destroy research plants.
<http://www.latimes.com/news/nationworld/nation/wire/sns-ap-us-farm-scene-blueberry-blight.0.6026101.story>.

The Michigan Department of Agriculture (MDA) recently announced that Blueberry shock and Blueberry scorch viruses have been identified for the first time in Michigan. Despite the development of a State external quarantine in 2002 to try to prevent entry of these viruses, recent tests found Blueberry shock virus in a research plot at a Michigan State University (MSU) research station in Fennville, and Blueberry scorch virus on two farms in the south-western part of the state. Both viruses can cause significant losses to blueberry producers, so MDA and MSU officials are aggressively implementing an eradication plan. Infected plants have been destroyed and MDA agents are testing adjacent areas to ensure the viruses have not spread.

Comments: Both of these blueberry viruses have been reported from Canada in the past and are not regulated by CFIA as quarantine pests. However, due to quarantines in other jurisdictions, these viruses have caused certification issues for CFIA. The above report illustrates the importance some jurisdictions place on these viruses. Michigan is the United States' number one blueberry producer with more than 19,000 reported acres producing 110 million pounds of blueberries, valued at \$124 million in 2008.

3) Green Timber Is Not a Pathway for Spreading *Phytophthora pinifolia*

Sources: Ahumada R., C. Díaz, M. Peredo, C. Barriá, P. González and G. Cuevas G. 2009. Detection of possible *Phytophthora pinifolia* infection in *Pinus radiata* green sawn timber produced in Chile. Abstracts from the 4th Sudden Oak Death Science Symposium, 2009-06-15/18, Santa Cruz, California, USA, p 18.
http://nature.berkeley.edu/comtf/sodsymposium4/pdf/book_of_abstracts.pdf; Also in EPPO Reporting Service #2009/164.
Green timber is not a pathway for spreading *Phytophthora pinifolia*.



Phytophthora pinifolia is a newly-described needle blight pathogen of *Pinus radiata* that is found in parts of Chile (i.e. in Arauco and Valdivia provinces), where it has caused some significant tree mortality. A recent study to determine whether *P. pinifolia* could be found in green timber produced from infected trees, or trees that had been exposed to inoculum for 4 years, indicated that such timber is not a likely pathway for spreading the pathogen.

Comments: *Phytophthora pinifolia* is a significant pathogen of *P. radiata* growing in plantations in parts of Chile. What impacts the pathogen might have under different environmental / climatic conditions, or to other pine species, remains largely unknown. Regardless, this current research suggests that green lumber harvested from infested areas of Chile is unlikely to spread the pathogen into other regions or countries.

4) Pear Trellis Rust, *Gymnosporangium sabinae* (= *G. fuscum*) - First Report From Michigan

Source: Yun, H. Y., A. Y. Rossman and J. Byrne. 2009. First Report of *Gymnosporangium sabinae*, European Pear Rust, on Bradford Pear in Michigan. *Plant Disease*, Vol. 93(8):841.

In late summer and fall of 2008, the aecial stage of *Gymnosporangium sabinae* (Dicks.) G. Winter (previously known as *G. fuscum*) was collected from leaves of Bradford pear, *P. calleryana* Decne., in Farmington, MI (Oakland County). Bradford pear is an ornamental pear species known for its flowers, leaf colour in fall and disease resistance, making it desirable as a street tree. The one tree found infected had foliage that was severely affected by the rust fungus. Telia and teliospores of *G. sabinae*, which are produced on an alternate host (various species of *Juniperus* sect. *Sabinae*), were not observed.

Comments: *G. sabinae* (i.e. *G. fuscum*) is relatively rare in North America, although it is widely distributed in Europe, and extends into Asia and North Africa, where it is known to attack commercial pear and ornamental juniper plants. The fungus has been known from British

Columbia since the 1960s, where a Provincial regulatory program consisting of surveillance and destruction of infected plants was enforced until relatively recently. In the past year or two, the fungus has now also appeared on landscape pear in parts of Ontario. In the United States, the fungus had previously been reported from California and Alabama. This new report from Michigan extends the known distribution of this fungus within the USA.

5) Tobacco Rattle Virus Reported from Peony in Alaska

Source: Robertson, N. L., K. L. Brown and L. M. Winton. 2009. First Report of *Tobacco rattle virus* in Peony in Alaska. *Plant Disease*, Vol. 93(6):675.

In 2007, scattered peony (*Paeonia lactiflora* 'Sarah Bernhardt') plants cultivated on small plots at the University of Alaska displayed distinct leaf ringspot patterns typical of a virus infection. Symptoms were more severe during the cooler months of the growing season (June and September), with symptom remission in the intervening warmer months. Leaf samples collected from symptomatic plants, collected in July and September, were assayed for viruses. On the basis of the biological and molecular data it was determined that the plants were infected with *Tobacco rattle virus* (TRV).

Comments: This report expands on the known distribution of this virus in North America. TRV can cause significant problems in potato production, mainly affecting tuber quality. As a result the virus is of concern relative to seed potato production, and in Canada, it is regulated as a non-quarantine pest. The virus has a wide host range and can be spread in and between crops by soil-borne nematode vectors. Avoiding the planting of infected ornamentals in or around seed potato production areas is especially important to prevent movement of the virus into potato crops.



6) Internet Sales of Plants for Planting – An Increasing Trend and Threat?

Source: Giltrap, N., D. Eyre and P. Reed. 2009. EPPO Bulletin, Vol. 39(2):168-170.

This report from the UK highlights the significant phytosanitary concerns surrounding the ever increasing sale of plants for planting over the Internet, or by other direct marketing methods (e.g. newspaper offers). Some specialist internet suppliers, often in other regulatory jurisdictions, sell and ship by mail/post, quantities of plants for planting to large numbers of amateur growers scattered throughout the country. It is often difficult for the National Plant Protection Organization (NPPO) to keep track of this type of activity, especially when the supplier is located in another country. Using examples of unregulated imports into the UK of goji berry and *Acer palmatum* plants from off-continent sources, these authors illustrate the complications surrounding the growth of internet sales in plants and plant products, and how such sales could seriously compromise national plant health regulatory programs.

Comments: Increased monitoring by national plant protection organizations of internet sites that market plants for planting or plant products may help to circumvent some potentially serious future plant pest incursions / phytosanitary incidents. However, as pointed out by these authors, effective monitoring of the Internet is extremely labour intensive. By way of example, they cite a search on eBay of UK plant sellers in 2008, which produced more than 9000 returns. Some phytosanitary organizations, like USDA-APHIS, have developed automated internet search capabilities to search for infringing websites. However, the cost of running such systems can be substantial.

7) Climate Change in NE North America and Impacts on Forest Pests, Diseases and Weeds

Source: Dukes, J. S. et al. 2009. Responses of insect pests, pathogens, and invasive plant species to climate change in the

forests of northeastern North America: What can we predict? *Can. J. For. Res.*, Vol. 39(2): 231–248.

By the year 2100, it is estimated that the north-eastern US and eastern Canada will experience temperature increases of approximately 3–5°C, as well as increased winter precipitation. Such changes will directly and indirectly affect forests, as well as forest pests, diseases and weeds. This study shows how basic ecological principles can be used to predict forest pest species' responses to climate change and how this is likely to impact north-eastern forests. Analysis shows the potential responses by some specific forest pests, diseases and weeds to this change in climate. Several pest species are predicted to have stronger or more widespread impacts on forest composition and structure.

Comments: Consideration of future climate change scenarios and what impacts these changes might have on plant pests, diseases, or weeds is an area of increasing interest amongst scientists. While the predictions made in such analyses are often subject to considerable uncertainty, the information can still be of great value, and in a regulatory framework, can assist in conducting pest risk assessments or developing regulatory policies.

8) DNA Barcoding Reveals Exotic Moth Species in Vancouver

Source: deWaard, J. R., J.-F Landry, B. C. Schmidt, J. Derhousoff, J. A. McLean and L. M. Humble. 2009. In the dark in a large urban park: DNA barcodes illuminate cryptic and introduced moth species. *Biodiversity Conservation*, online 8 July 2009.

DNA sequences from several hundred light-collected moths from Stanley Park, Vancouver, were analysed by sequence analysis ("barcoding") and assigned species identifications. Among the 925 specimens were four previously unrecorded exotic species: *Argyresthia pruniella*, *Dichelia bistrionana*, *Paraswammerdamia lutarea* and *Prays fraxinella* (new to the west coast, previously recorded from Newfoundland). Another significant find is that 1 in 6 species encountered



was exotic, and that some guilds had higher proportions of exotics: 5 of 6 most common species were exotic and 8 of 11 leafrollers (Tortricidae) were exotic.

Comments: This study firstly shows the benefit of creating a baseline faunal list for an area of concern. The port of Vancouver, along with other Canadian ports like St. John's, Halifax and Montreal, receive the bulk of Canada's shipped imports and also represent a first potential home for new exotic species. Repeated surveys such as this one can detect new species, as well as allow for approximate dates of introduction of new finds by cataloguing the species present at any one time. This information is useful when considering management options -- species present for a long time, even at low levels, are more difficult to eradicate and may be further from the port area than those just recently found.

P. fraxinella and *A. pruniella* are found in Europe from Ireland to Russia, *D. histriionana* is found from Europe to the Middle East, and *P. lutarea* is found from Europe to Turkmenistan. Interestingly, none are reported from eastern Asia, suggesting that they may have had a longer history in North America and may be more widespread. Only *A. pruniella* is mentioned in standard pest handbooks, and even there it is noted as being "seldom of economic importance", so none of these species seem to pose any significant threat to plants growing in Canada.

9) When Do We Declare an Invasive Species Eradicated?

Source: Rout, T. M., Y. Salomon and M. A. McCarthy. 2009. Using sighting records to declare eradication of an invasive species. *Journal of Applied Ecology*, Vol, 4: 110-117.

Declaring an invasive species eradicated is usually based on a set time for a series of negative results ("no finds"). For instance, 3 consecutive years of negative survey results may be used, but such an approach has limitations, especially when the species becomes rarer as eradication efforts become successful. It also does not consider the

cost of the surveys relative to the cost of premature declaration of eradication. This paper suggests using the sighting rate -- the number of times a species is detected during surveys -- to estimate the number of negative surveys required before a declaration of eradication is warranted given A) the cost of continuing with surveys and B) the cost of premature declaration. The authors also present an approximation and a "rule of thumb" that is nearly as accurate as the more mathematical calculations produced by their model.

Comments: Application of such an approach to invasive pest eradication efforts in Canada would strengthen the reasoning behind any declaration of eradication, by including a defensible limit on the time spent on negative surveys based on the cost of the surveys as well as the cost of falsely declaring a species eradicated. Such a system could also be implemented by Canada to determine whether or not to accept the declarations of eradications pronounced by other national plant protection organizations for plant pests that may be imported into Canada.

BIOTECHNOLOGY ARTICLE

10) Restoring a Maize Root Signal That Attracts Insect-Killing Nematodes to Control a Major Pest

Source: Degenhardt, J., I. Hiltbold, T. G. Köllner, M. Frey, A. Gierl, J. Gershenzon, B. E. Hibbard, M. R. Ellersieck and T. C. J. Turlings. 2009. Restoring a maize root signal that attracts insect-killing nematodes to control a major pest. *PNAS*, Vol. 106:13213-13218.

Transformation of maize with a (E)- β -caryophyllene synthase gene from oregano restores the ability to produce a volatile compound that attracts entomopathogenic nematodes that contribute to the biological control of the western corn rootworm (*Diabrotica virgifera virgifera* LeConte). In fields infested with the rootworm in which the entomopathogenic nematode *Heterorhabditis megidis* was released, plants emitting the (E)- β -caryophyllene showed



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less root damage and had fewer adult beetles emerge than untransformed, non-emitting plants.

Comments: This trait could be used as an alternative or an addition to insect resistance achieved through expression of Bt toxins. Since European and ancestral maize lines are capable of producing (E)- β -caryophyllene, it may also be possible to develop this trait through classical breeding.

ANIMAL HEALTH ARTICLES

11) Susceptibilities of Nonhuman Primates to Chronic Wasting Disease

Source: Race B., K. D. Meade-White, M. W. Miller, K. D. Barbian, R. Rubenstein, G. LaFauci, et al. 2009. Susceptibilities of nonhuman primates to chronic wasting disease. *Emerging Infectious Diseases*. September; [Epub ahead of print].

Human susceptibility to chronic wasting disease (CWD) remains unproven despite likely exposure to CWD-infected cervids. During a recent study, 2 nonhuman primate species (cynomolgus macaques and squirrel monkeys) were inoculated with CWD intracerebrally and orally to investigate human susceptibility to the disease. Squirrel monkeys showed clinical signs of disease (similar to those of CWD infection in cervids) 33–53 months post intracerebral inoculation. Following oral exposure, 2 squirrel monkeys had PrPres in brain, spleen, and lymph nodes at 69 months post-inoculation. In contrast, cynomolgus macaques have not shown evidence of clinical disease as of 70 months post-inoculation. The authors suggest humans may also be resistant to CWD because they are evolutionarily closer to macaques than to squirrel monkeys.

Comments: To provide comparative timeframes, intracerebral inoculation of cynomolgus macaques with BSE caused disease 3 years post-inoculation, while a minimum of 5 years was required before they showed signs of clinical disease following oral inoculation with BSE. With this in mind, CWD transmission to cynomolgus macaques cannot be ruled out at this

point, as the study report was published just 5 years post-inoculation. The authors plan to continue the study for at least several more years.

Epidemiological studies of humans living in CWD-endemic areas of Colorado and Wyoming support these findings, as they have not found any increases in human TSE prevalence.

12) Retinal Scan Technology Identifies Early TSE Symptoms in Cattle

Source: McGinnis, L. 2009. Retinal Scan Technology Identifies Early TSE Symptoms in Cattle. *Agricultural Research Magazine*, Vol. 57(7) (August 2009).

Scientists have developed and tested a retinal scanning tool that could be used to screen live cattle for transmissible spongiform encephalopathies (TSE). By examining specially stained retinal samples under the microscope, researchers observed structural changes in bipolar cells (a type of cell found in the retina) in infected cattle. The scientists then used electroretinography to measure retinal response in healthy and TSE-infected cattle. They observed significant changes in the response of the bipolar cells. The technology also detected the changes about 12.5 months after the cattle had been experimentally infected (approximately 5.5 months before cattle generally begin to show clinical signs of disease). The researchers are currently working on how to shorten the time required for the testing process and how to make it more practical for use outside of a laboratory. The test currently takes 10 to 20 minutes.

Comments: Several research groups are currently working towards live animal tests for TSEs. Another research team (Gordon et al., 2009) has identified disease-specific patterns in circulating nucleic acids in blood samples from elk and cattle orally challenged with chronic wasting disease and bovine spongiform encephalopathy (BSE), which may lead to development of a relatively simple live animal test.



It will be important for future test kits to be less expensive than current post-mortem BSE tests, and that they be quick and practical. Such a test would make it possible to certify live animals prior to export and to market beef as 'BSE-tested', which would help maintain current export markets, as well as help to develop new ones. Canada's total beef exports are worth \$2.2 billion annually and Canada is the third-largest exporter of beef in the world.

Reference: Gordon, P., et al. 2009. Disease-specific motifs can be identified in circulating nucleic acids from live elk and cattle infected with transmissible spongiform encephalopathies. *Nucleic Acids Research*, Vol. 37 (2), doi:10.1093/nar/gkn963.

13) Prions Are Secreted in Milk from Clinically Normal Scrapie-Exposed Sheep

Source: Maddison, B. C., C. A. Baker, H. C. Rees, L. A. Terry, L. Thorne, S. J. Bellworthy, G. C. Whitlam and K. C. Gough. 2009. Prions Are Secreted in Milk from Clinically Normal Scrapie-Exposed Sheep. *Journal of Virology*, Vol. 83(16): 8293-8296.

A recent study used serial protein misfolding cyclic amplification (sPMCA) to detect prions in milk from sheep with scrapie, as well as in milk from scrapie-exposed sheep at least 20 months before clinical onset of disease. The data indicate secretion of prions within milk during the early stages of disease progression and a possible role for milk in prion transmission. The authors also highlight that application of sPMCA to milk samples offers a non-invasive method to detect scrapie during preclinical/subclinical disease.

Comments: Scrapie is not transmissible to humans and it is currently unknown whether other prion diseases result in the secretion of prions within milk. The authors suggest that it is plausible that similar secretion mechanisms may occur with chronic wasting disease, variant Creutzfeldt-Jakob disease and experimental ovine BSE, as they show a similar distribution of infectivity within tissue.

14) Isolation of Genetically Diverse Marburg Viruses from Egyptian Fruit Bats

Source: Towner, J. S., B. R. Amman, T. K. Sealy, S. A. R. Carroll, J. A. Comer et al. 2009. Isolation of Genetically Diverse Marburg Viruses from Egyptian Fruit Bats. *PLoS Pathogens*, Vol. 5(7): e1000536. doi:10.1371/journal.ppat.1000536.

For the first time, a study has identified the natural reservoir of Marburg virus. Egyptian fruit bats (*Rousettus aegyptiacus*) were determined to be the likely reservoir after miners were diagnosed with Marburg hemorrhagic fever after working in a cave in Uganda in July and September 2007. They were determined to be the likely source of infection based on detection of Marburg virus RNA in 31/611 (5.1%) bats, virus-specific antibody in bat sera, and isolation of genetically diverse virus from bat tissues.

The bat colony was estimated to be over 100,000 animals and the genetically diverse virus genome sequences from bats and miners closely matched. It is also important to note that the virus was isolated directly from apparently healthy bats, and that limited tests conducted on arthropod parasites of bats were negative for evidence of Marburg virus infection.

Comments: Marburg virus affects humans and non-human primates, and can cause large outbreaks of hemorrhagic fever with case fatalities approaching 90%. For decades, the natural reservoir of the virus has remained unknown, although evidence has suggested bats were the natural reservoir for some time. The Egyptian fruit bat (*R. aegyptiacus*) is common throughout Africa with distribution into the eastern Mediterranean and Middle East.

15) Roche and Google.org Start Initiative for Early Discovery of New Diseases

Source: Business Wire. July 28, 2009. Roche and Google.org Start Initiative for Early Discovery of New Diseases http://www.businesswire.com/portal/site/google/?ndmViewId=news_view&newsId=20090728005456&newsLang=en.

Roche and Google.org recently started a joint project to demonstrate the feasibility of



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developing a multidisciplinary surveillance, research and response system. The system is expected to enhance the ability to predict and prevent emerging infectious diseases in East Africa and will focus primarily on arboviruses. The initiative will survey human, livestock, wildlife and vector populations to monitor the circulation, transmission and maintenance of arboviruses, with a focus on Rift Valley fever virus. It will employ state of the art genomics and knowledge management systems to advance understanding of the dynamics and diversity of disease-causing agents, their vectors and hosts and will also link to existing risk information and decision support tools to provide early warning of disease outbreaks and enable rapid responses.

Comments: This new technology will help to enhance the capacity of surveillance and research groups in East Africa, a region that is known for emergence of new infectious viral agents and new strains of known viruses.

16) New Bluetongue Test Kit Commercialized

Source: Media-Newswire.com, August 18, 2009. http://media-newswire.com/release_1096517.html.

A single molecular assay kit that is able to identify and distinguish seven of the European bluetongue virus (BTV) serotypes (BTV 1, 2, 6, 8, 9, 11 and 16) is now commercially available. The technology can be used on blood samples and is much faster and more reliable than conventional serological typing methods, generating results in a matter of hours rather than weeks.

The test kit was developed by the United Kingdom's Institute for Animal Health (IAH) in collaboration with industry. IAH is the European Community reference laboratory for bluetongue, as well as the OIE reference laboratory for BTV.

Comments: There are currently 25 known serotypes of BTV and each requires a separate vaccine to achieve protection. The emergence of

multiple strains of the virus in Europe means that it is now very important to be able to identify serotypes as rapidly as possible. This new kit will help to speed testing and control efforts for BTV in Europe, reducing the magnitude and severity of outbreaks, as well as the economic impact on the livestock industry.

17) Development of a Rift Valley Fever ELISA That Can Distinguish Infected From Vaccinated Animals

Source: McElroy, A. K., C. G. Albarino and S. T. Nichol. 2009. Development of a RVFV ELISA that can distinguish infected from vaccinated animals. *Virology Journal*, Vol. 6:125, doi:10.1186/1743-422X-6-125.

The ability to distinguish infected from vaccinated animals is very important for vaccine acceptance by national and international authorities because of restrictions on movement and export of infected animals. This study describes the development of side by side ELISAs that can be used to distinguish animals naturally infected with Rift Valley Fever (RVF) from those that have been vaccinated with a mutant RVF virus. The mutant virus was constructed through the use of reverse genetics and is missing one or more viral virulence factors. The virus has been shown to be completely non-pathogenic in rats and is able to provide 100% protection from challenge with wild type RVF virus. The assay can also be used without the use of bio-containment facilities and has potential for use in both human and animal populations.

Comments: RVF is a pathogen of humans and livestock that causes significant morbidity and mortality throughout Africa and the Middle East. A vaccine that provides protection to animals would also be beneficial to human populations because prevention of the amplification cycle in livestock would greatly reduce the risk of human infection by preventing livestock epizootics. Furthermore, a test that distinguishes between infected and vaccinated animals will also help re-establish export markets and disease-free status.



18) Chile Detects H1N1 in Turkeys

Sources: Anon. 2009. A/H1N1 influenza virus passes to birds. *The Veterinary Record*, Vol. 165(9); ProMed. August 21, 2009. INFLUENZA PANDEMIC (H1N1) 2009, ANIMAL HEALTH (03): CHILE (VALPARAISO), AVIAN, REQUEST FOR INFORMATION; ProMed. August 29, 2009. INFLUENZA PANDEMIC (H1N1) 2009, ANIMAL HEALTH (05): CHILE, AVIAN.

In August, Chile reported the detection of the H1N1 influenza virus in turkeys. This is the first time the virus has been found outside humans or swine. The virus was detected following a drop in egg production; the birds showed no respiratory signs and there was no increase in mortality. Prior to the appearance of clinical signs, some of the birds had been exposed to humans with respiratory symptoms. Genetic sequencing studies have concluded that the virus isolated from the turkeys corresponds to a variant of the influenza A (H1N1) 2009 virus that has been circulating in humans in Chile.

Comments: The detection of the H1N1 virus in turkeys in Chile raises concern that poultry farms elsewhere in the world could also become infected with the virus. Introduction of H1N1 to poultry in South East Asia may be of particular concern, given the potential for reassortment with H5N1.

Chile is the 4th country to investigate transmission of H1N1 from farm workers to animals. The virus has also been detected in swine in Canada, Argentina and, most recently, Australia. Even though clinical infections in pigs and turkeys have been generally mild, establishment of the virus in pig and poultry farms may result in negative economic impacts, due to trade related restrictions and decreases in retail sales, due to misguided perceptions of the quality and safety of meat products.

19) Evaluating a Deer-Targeted Acaricide Applicator for Area-Wide Suppression of Blacklegged Ticks, *Ixodes scapularis*

Source: Miller, N. J., W. A. Thomas and T. N. Mather. 2009. Evaluating a deer-targeted acaricide applicator for area-wide

suppression of blacklegged ticks, *Ixodes scapularis* (Acari: Ixodidae), in Rhode Island. *Vector-borne and Zoonotic Diseases*, Vol. 9(4), doi: 10.1089/vbz.2008.0164.

Over a 5-year period, “4-Poster” acaricide applicators were distributed in areas of high deer activity throughout a 518-hectare area in a rural Rhode Island community. The '4-poster' has a central bin filled with corn that fills specially designed feeding troughs surrounded by a pair of foam posts at either end of the device. An approved acaricide, to kill ticks, is applied weekly to the foam posts. Deer rub their head against these posts while attempting to get the corn. The efficacy of acaricide treatment was determined by comparing relative blacklegged tick (*Ixodes scapularis*) densities in the 4-Poster treatment site to a separate, similar-sized non-treatment area. After 2 years of treatment (nearly 12,000kg of corn consumed), nearly 50% control of nymphal blacklegged ticks was achieved within the treatment site compared with tick abundance levels in the non-treated area. Moreover, that level of tick control was maintained for 1 year after removal of the 4-Poster devices.

Comments: *Ixodes scapularis* is a vector of several diseases of animals and humans, such as Lyme disease, babesiosis and anaplasmosis. The range of *I. scapularis* is expanding in the eastern and central provinces of Canada (Ontario, Nova Scotia, New Brunswick and Manitoba). Although the article did not include an economic analysis, an assessment of the economics costs and projected potential benefits of feeding and treating deer in terms of mitigated public health and animal disease control costs would be worthwhile.

20) Infection of Grasshoppers Following Ingestion of Plants Harboring Vesicular Stomatitis Virus

Source: The Dairy Site Newsletter. August 27, 2009. Grasshoppers Can Transmit Virus to Livestock; Drolet, B. S., M. A. Stuart and J. D. Derner. 2009. Infection of *Melanoplus sanguinipes* grasshoppers following ingestion of rangeland plant species harbouring vesicular stomatitis virus. *Applied and Environmental Microbiology*, Vol. 75(10): 3029-3033.

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Migratory grasshoppers [*Melanoplus sanguinipes* (Fabricius)] have been implicated as efficient amplifying reservoirs and mechanical vectors of vesicular stomatitis virus (VSV). The grasshopper-cattle-grasshopper transmission cycle is based on the assumptions that (i) virus shed from clinically infected animals contaminates pasture plants and remains infectious on plant surfaces; (ii) grasshoppers become infected by eating the virus-contaminated plants; and, (iii) grasshoppers are ingested by grazing cattle (grasshoppers are typically ingested by grazing animals when they are immobile during one of five molting stages and it is estimated that grazing cattle consume approximately 50 per day).

A recent study examined the stability of VSV on common plant species found in US Northern Plains rangelands and assessed the potential of these plant species as a source of virus. The frequency of viable virus recovery from plants at 24 h postexposure was as high as 73%. The two most common plant species in the rangelands (western wheatgrass [*Pascopyrum smithii*] and needle and thread [*Hesperostipa comata*]) were then fed to grasshoppers. At 3 weeks postfeeding, the grasshopper infection rate was 44 to 50%. The study also found that use of grasshopper pesticides on pastures decreased grasshopper populations and also decontaminated pastures, thereby decreasing possible spread of VSV.

Comments: Soil and plants are suspected sources of VSV, although there is not sufficient evidence to confirm their role in VSV transmission. Therefore, decontamination of corrals and pastures or elimination of grasshoppers are not current disease control recommendations for VSV. *M. sanguinipes* is found throughout North America and adult grasshoppers of this species have been reported to travel 48 km per day and as far as 925 km during their migrations. Geospatial correlations have been observed between outbreaks and grasshopper infestations.

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