

DOI: <https://doi.org/10.31005/iajmh.v4i.210>

1 **OPINION PAPER**

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4 **Food Security and Research Agenda in African Swine Fever Virus: a new**
5 **Arbovirus Threat in the Dominican Republic**
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14 **Abstract**

15 An outbreak of African Swine Fever Virus (ASFV) has been reported in La Hispaniola.
16 Ecological niches of transmission and further characterization of vectors involved should
17 be included in a research agenda to reduce the impact on emerging pathogens affecting
18 food security in a previous afflicted region.
19

20
21 The economic impact and health systems caused by the COVID-19 pandemic in
22 developing countries have not yet been well defined. In recent months, an outbreak of
23 diphtheria has been reported in the Dominican Republic (DR)¹ and resurgence of
24 diseases transmitted by vectors and vaccine-preventable have become elements of
25 concern not only for the country but also for the entire Latin American.¹ More recently,
26 cases of the African swine fever virus (ASFV) have been confirmed in more than 14
27 provinces of the island nation, activating regional epidemiological alerts [Figure 1].^{2,3}
28

29 ASFV is the only member of the *Asfaviridae* family, and the only known DNA arbovirus,⁴
30 the virus has been following a pattern of endemicity in Africa facilitated by a sylvatic cycle
31 in soft ticks of the genus *Ornithodoros* and *Phacochoerus africanus*.⁵ ASFV was first
32 identified in Kenya in 1921⁴ and outbreaks have been reported in Europe and the
33 Americas since. ASFV is highly stable and easily transmissible by infected pigs and
34 contaminated derived products, as well as fomites, or by the transmission of *Ornithodoros*
35 vectors itself. Its expansion outside of Africa has intensified since 2007⁵, affecting four
36 continents and millions of losses to the pig industry. Only in China has it caused it to be
37 unable to produce the demand for pork for its population and importing it almost
38 exclusively from other countries.⁴
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40 No human ASFV has been confirmed after meat consumption, however, few dare to
41 consume it affecting the economic industry and increasing prices in other similar products.
42 Previously in 1978⁶ a ASFV outbreak was reported, and the complete pig population was
43 eradicated with an estimated to 1.5 million pigs, to reactive the local production a
44 complete replaced breeds were introduced mainly from Europe.⁴ After research
45 investigations, Hispaniola's cases were associated to an outbreak in some regions of
46 Spain and Portugal, and spread to Sardinia, Malta, Brazil, the Dominican Republic, Cuba,
47 and Haiti.⁷

48
49 During the 1978-80's outbreak In the Dominican Republic, small-scale producer of pigs,
50 were hiding animals making a cumbersome activity to detect the complete expansion of
51 the viral transmission across the island.⁷ Officially was controlled late 1980, the origin of
52 ASFV circulation was attributed to the feeding of pigs with trash or other food remains.
53 The other source proposed contamination was through the land borders between the DR
54 and Haiti, attributed to sylvatic contact of pigs or traffic in contaminated meat, not
55 controlled by the authorities.⁷ To the date their limited information in the scientific literature
56 of circulating ASFV on *Ornithodoros* ticks or other arthropod vectors in La Hispaniola;
57 however, based on the fluctuating reports of ASFV in the same geographical area suggest
58 that tick's vectorial capacity and broad distribution might played an important role of
59 cryptic transmission of the virus in the island over decades.

60 As July 2020, the Dominican Ministry of Agriculture confirmed "a small outbreak" of AFSV
61 in Montecristi (northwest) and Sánchez Ramírez (Northcentral) provinces, later the World
62 Organisation for Animal Health (OIE) confirmed the viral circulation in 14 provinces
63 including the capital city, Santo Domingo.³ The first measures adopted by the authorities
64 were to prohibit the mobilization of live or dead pigs from and to provinces, where a "total
65 military control was placed in all strategic points", it is estimated that only in Sanchez
66 Ramirez province there is an estimated 17,000 pigs.⁹ As no vaccines are available against
67 the virus, there is a protocol that obliges countries to proceed with the elimination of their
68 pig population (sick, suspected, or healthy), and the destruction of corpses and
69 contaminated products, and disinfection.¹⁰

70 The agricultural economic sector in the DR only represented 6.0% of GDP in 2020, of
71 which the livestock sub sector accounted for 1.9% of the economy.¹¹ Measured by
72 contribution to GDP, the effects of the AFSV on the aggregate economy might be
73 underestimated, but its effect on domestic consumption is higher. Pork consumption in
74 2020 was 2.4 million quintals,¹⁰ approximately 21% of meat consumption in the country,
75 lower than chicken consumption (7.2 million quintals) but higher than beef consumption
76 (1.5 million quintals). Moreover, pork consumption heavily depends on domestic
77 production, approximately 97% of total consumption. It is expected that this situation will

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78 increase chicken consumption in the short term, which in turn would increase chicken
79 price given short term restrictions to meet demand in a narrow period.¹²

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81 In fact, prices have doubled at the beginning of August, and supermarkets are rationing
82 purchases, which will increase inflation since chicken account for 2.5% of CPI,^{12,14} the
83 highest percentage among goods, therefore the increase in prices due to AFSV are
84 increasing poverty and inequality. The political turmoils in Haiti and the sequelae of a new
85 earthquake, migrants' mobilization and now elements affecting the food security
86 represents a concerning situation in the island nations. The research agenda in AFSV on
87 the distribution and characterization of vectors involved in the AFSV transmission in the
88 Caribbean. It is needed a consistent animal health and production monitoring, with
89 technical expertise, especially among those small farmers, providing rapid disease
90 detection and reporting, sample collection.

91
92 This prioritized agenda will be focused on future research in zoonotic diseases and its
93 vectors and will help to fill critical knowledge gaps. Political leadership, local communities,
94 stakeholders, and researchers from Academia should all support these priority questions
95 and themes to collaboratively drive to move forward.

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98 References

- 99 1. Pan American Health Organization / World Health Organization. Epidemiological Update:
100 Diphtheria. 2 March 2021, Washington, D.C.: PAHO/WHO; 2021. Available at:
101 [https://iris.paho.org/bitstream/handle/10665.2/53380/EpiUpdate2March2021_eng.pdf?sequence=](https://iris.paho.org/bitstream/handle/10665.2/53380/EpiUpdate2March2021_eng.pdf?sequence=1&isAllowed=y)
102 [1&isAllowed=y](https://iris.paho.org/bitstream/handle/10665.2/53380/EpiUpdate2March2021_eng.pdf?sequence=1&isAllowed=y) [Retrieved on August 24th, 2021]
- 103 2. Panamerican Health Organization (PAHO): [https://www.paho.org/en/news/28-7-2021-latin-](https://www.paho.org/en/news/28-7-2021-latin-america-and-caribbean-face-avalanche-worsening-health-issues-if-covid-19)
104 [america-and-caribbean-face-avalanche-worsening-health-issues-if-covid-19](https://www.paho.org/en/news/28-7-2021-latin-america-and-caribbean-face-avalanche-worsening-health-issues-if-covid-19)
- 105 3. World Organisation for Animal Health (OIE), AFSV report in the Dominican Republic. Available at:
106 <https://wahis.oie.int/#/report-info?reportId=36844> [Retrieved August 27th, 2021]
- 107 4. Cwynar P, Stojkov J, Wlzlak K. African swine fever status in Europe. *Viruses*. (2019) 11. doi:
108 10.3390/v11040310
- 109 5. Penrith ML, Bastos AD, Etter EM C, Beltran-Alcrudo D. Epidemiology of African swine fever in
110 Africa today: sylvatic cycle versus socio-economic imperatives. *Transbound Emerg Dis*. (2019)
111 66:672–86. doi: 10.1111/tbed.13117
- 112 6. Oficial Presidential decree on ASFV in the Dominican Republic (1978). Available at:
113 [https://repositorio.unphu.edu.do/bitstream/handle/123456789/3067/7-](https://repositorio.unphu.edu.do/bitstream/handle/123456789/3067/7-Decreto%20n%C3%BAmero%20146%20del%20poder%20ejecutivo.pdf?sequence=1&isAllowed=y)
114 [Decreto%20n%C3%BAmero%20146%20del%20poder%20ejecutivo.pdf?sequence=1&isAllowed](https://repositorio.unphu.edu.do/bitstream/handle/123456789/3067/7-Decreto%20n%C3%BAmero%20146%20del%20poder%20ejecutivo.pdf?sequence=1&isAllowed=y)
115 [=y](https://repositorio.unphu.edu.do/bitstream/handle/123456789/3067/7-Decreto%20n%C3%BAmero%20146%20del%20poder%20ejecutivo.pdf?sequence=1&isAllowed=y) [Retrieved on August 27th, 2021].
- 116 7. Alexander FC. Experiences with African swine fever in Haiti. *Ann N Y Acad Sci*. 1992 Jun
117 16;653:251-6. doi: 10.1111/j.1749-6632.1992.tb19654.x. PMID: 1626878
- 118 8. World Organisation for Animal Health (OIE), AFSV report in the Dominican Republic. Available at:
119 <https://wahis.oie.int/#/report-info?reportId=36844> [Retrieved August 27th, 2021].

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143
9. Ministry of Agriculture, Dominican Republic, agricultural and economic activities, available at: <https://agricultura.gob.do/wp-content/uploads/2021/06/1.3-Ponderacion-Corriente-por-Actividad-Economica-2007-2019-1-1.xlsx> [Retrieved on August 27th, 2021].
 10. Ministry of Agriculture, Dominican Republic, agricultural and economic activities available at: <https://agricultura.gob.do/wp-content/uploads/2021/06/10.1-Consumo-Estimado-2015-2020.-En-Quintales.xlsx> [Retrieved on August 27th, 2021].
 11. Central Bank, Dominican Republic, Consumer Prices Index (2019-2020). Available at: https://cdn.bancentral.gov.do/documents/estadisticas/precios/documents/Anexos_documento_metodologico_IPC_base_anual_oct_2019-sep_2020.xlsx?v=1628459564045 [Retrieved on August 27th, 2021].
 12. Nunez N, 2020. Crece demanda por carne de pollo pese a aumento de precio. Available at: <https://listindiario.com/la-republica/2021/08/08/682903/crece-demanda-por-carne-de-pollo-pese-a-aumento-de-precio> [Retrieved August 27th, 2021]

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Figure 1. African Swine Fever Virus (ASFV) outbreak in the Dominican Republic (blue, provinces with symptomatic reports; red, confirmed cases by RT-PCR and serological assays).

