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**Evolution of antigenic and genetic characteristics of
foot-and-mouth disease virus serotype A circulating
in Thailand, 2007–2019**

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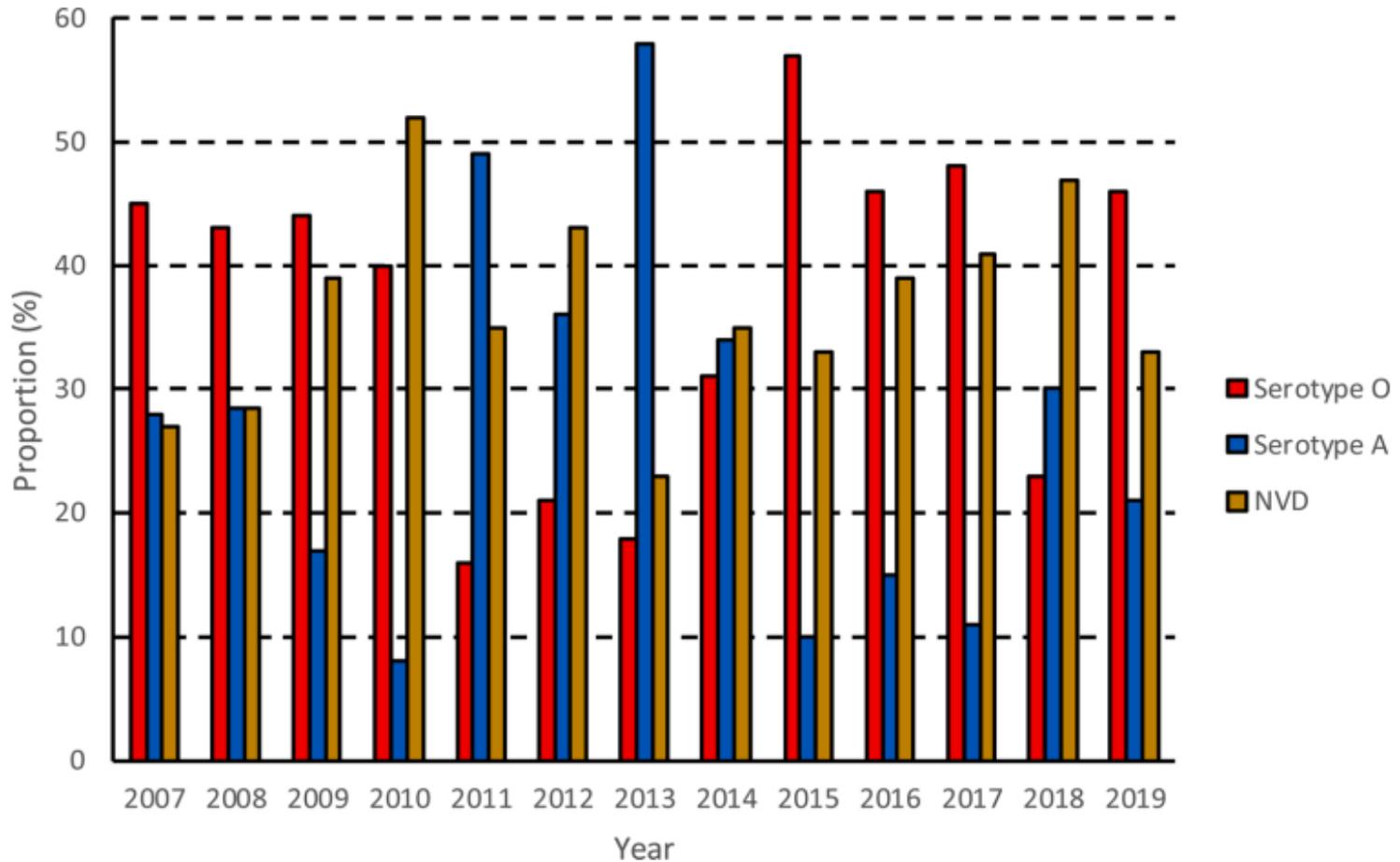
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Frequencies of FMDV detection in tissue samples collected in the field in Thailand during 2007–2019.



OBJECTIVE

To generate information on the antigenic and genetic variations of FMDV serotype A and its prevalence in Thailand from 2007 to 2019

Basis of virus transmission.

Facilitate the development of planning control strategies

Selection of appropriate vaccine strains for effective control of FMD

METHOD

Antigenic Study

- **Vaccine Matching (r-value)**
 - The serotypes of specimens from field outbreaks in Thailand during from 2007 to 2019 were identified using an ELISA.

Genomic Study

- Nucleotide sequence and phylogenetic analyses of the VP1 region
- Whole L-fragment genome sequencing

RESULTS

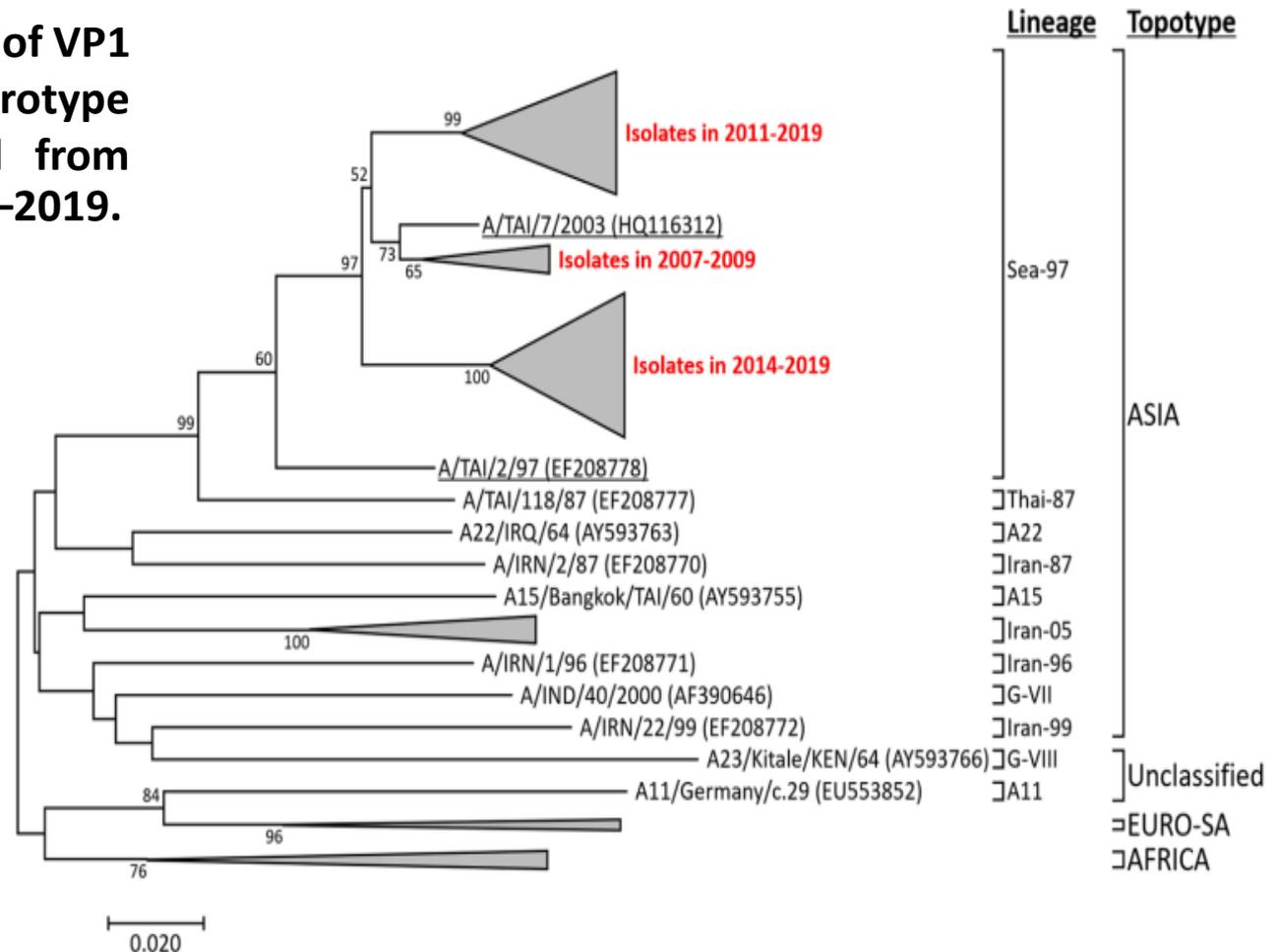
Serological relationships between FMDV field isolates and vaccine strains.

| Year | Vaccine strain | | |
|------|----------------|------------------|----------------|
| | A/118/87 | A/Sakolnakorn/97 | A/Lopburi/2012 |
| 2007 | 87.50 | 25.00 | 25.00 |
| 2008 | 100 | 69.23 | 30.77 |
| 2009 | 0 | 0 ^a | 0 ^a |
| 2010 | 0 | 100 | 100 |
| 2011 | 0 | 81.25 | 93.75 |
| 2012 | 0 | 0 | 75.00 |
| 2013 | 0 | 62.50 | 100 |
| 2014 | 0 | 100 | 100 |
| 2015 | 0 | 80.00 | 90.00 |
| 2016 | 0 | 100 | 44.44 |
| 2017 | 0 | 69.23 | 30.77 |
| 2018 | 0 | 75.00 | 100 |
| 2019 | 0 | 30.30 | 93.93 |

Frequencies (%) of isolates with r-value ≥ 0.4 (Good matching) compared with three vaccine strains. a Moderate matching. Shaded boxes indicate frequencies $\geq 65\%$.

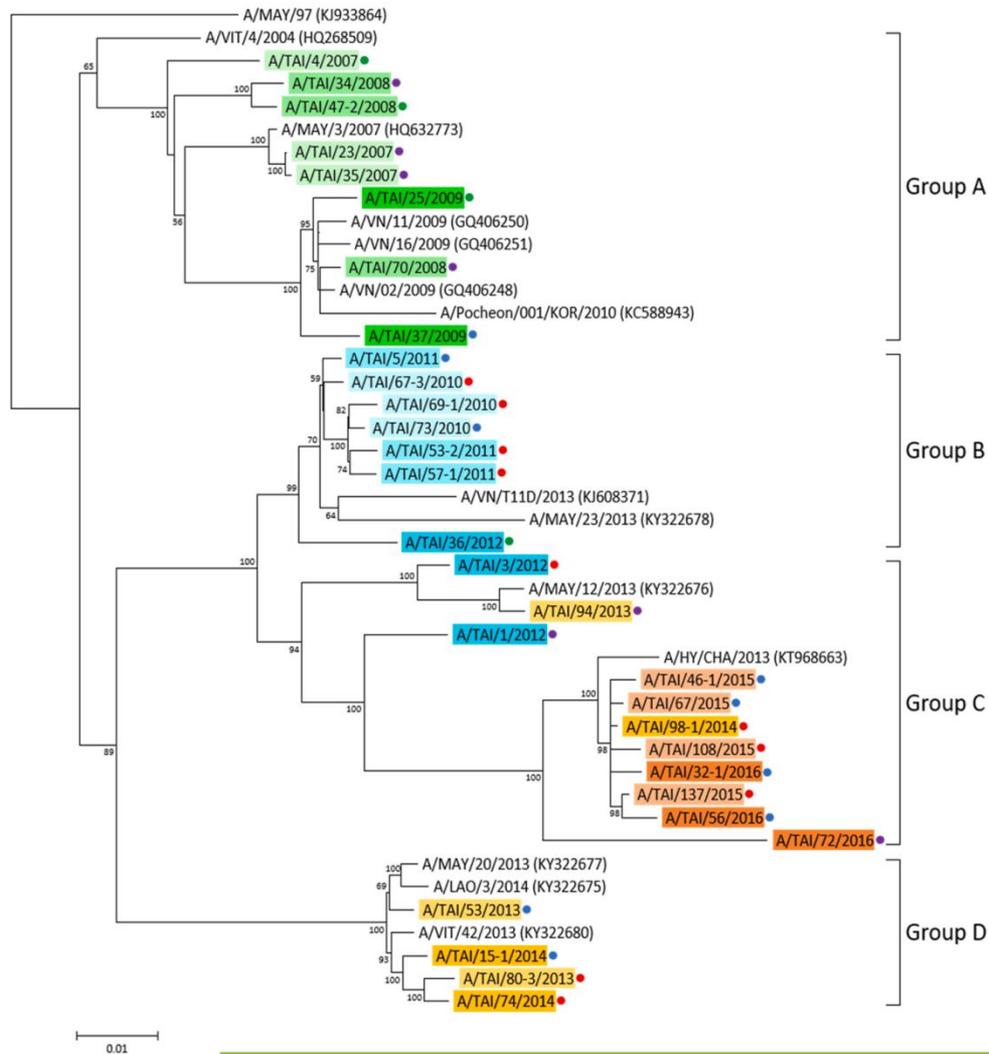
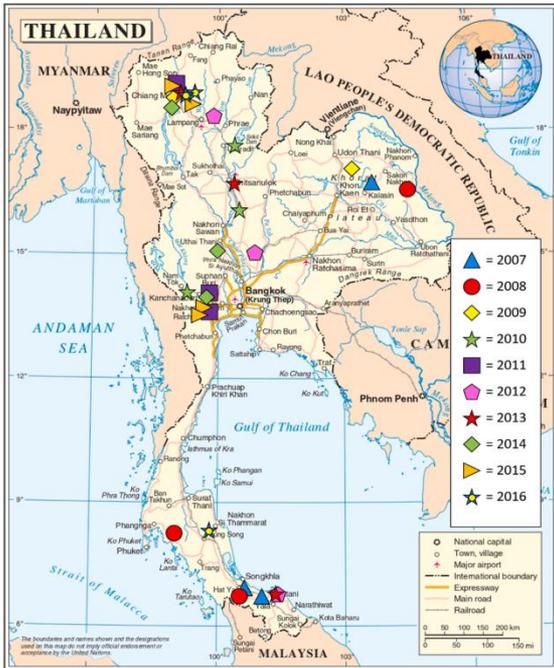
RESULTS

- Phylogenetic analysis of VP1 sequences of FMDV serotype A that were isolated from outbreaks during 2007–2019.



RESULTS

- Phylogenetic analysis of the complete L-fragment genome sequences of 30 FMDV serotype A isolates from outbreaks during 2007–2016.



| Year | Color |
|------|-------------|
| 2007 | Light Green |
| 2008 | Light Green |
| 2009 | Dark Green |
| 2010 | Light Blue |
| 2011 | Light Blue |
| 2012 | Light Blue |
| 2013 | Yellow |
| 2014 | Yellow |
| 2015 | Orange |
| 2016 | Orange |

| Region | Color |
|------------|--------|
| North East | Green |
| North West | Blue |
| Central | Red |
| South | Purple |

The highly variable regions with the lowest average identity 94.56 % which is VP1; and 78.43 %, which is 3A, respectively.

CONCLUSIONS

- FMDV serotype A isolates were collected mainly for antigenic and genetic characterization from most regions of Thailand with the goal of comprehensively protecting against and controlling FMD that from this study showed FMDV serotype A isolates from 2007 to 2019 are highly antigenically diverse, indicate that it will be difficult to control the disease.



- Therefore, continuous and routine surveillance could be conducting combined studies of antigenic and genetic characterization to improve country control strategies.

Thank for you attention

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