

PMI Evolve Resistance Monitoring

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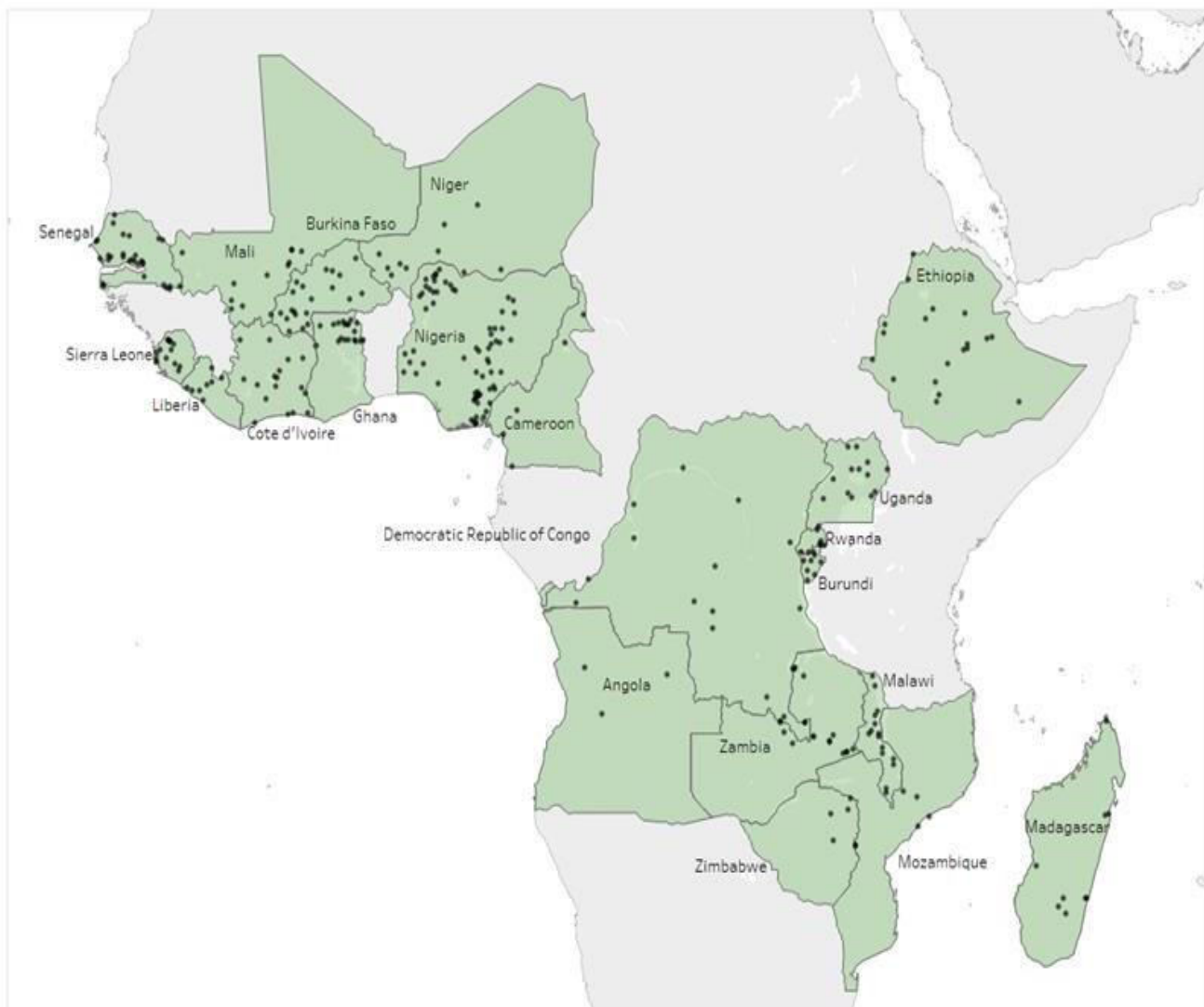
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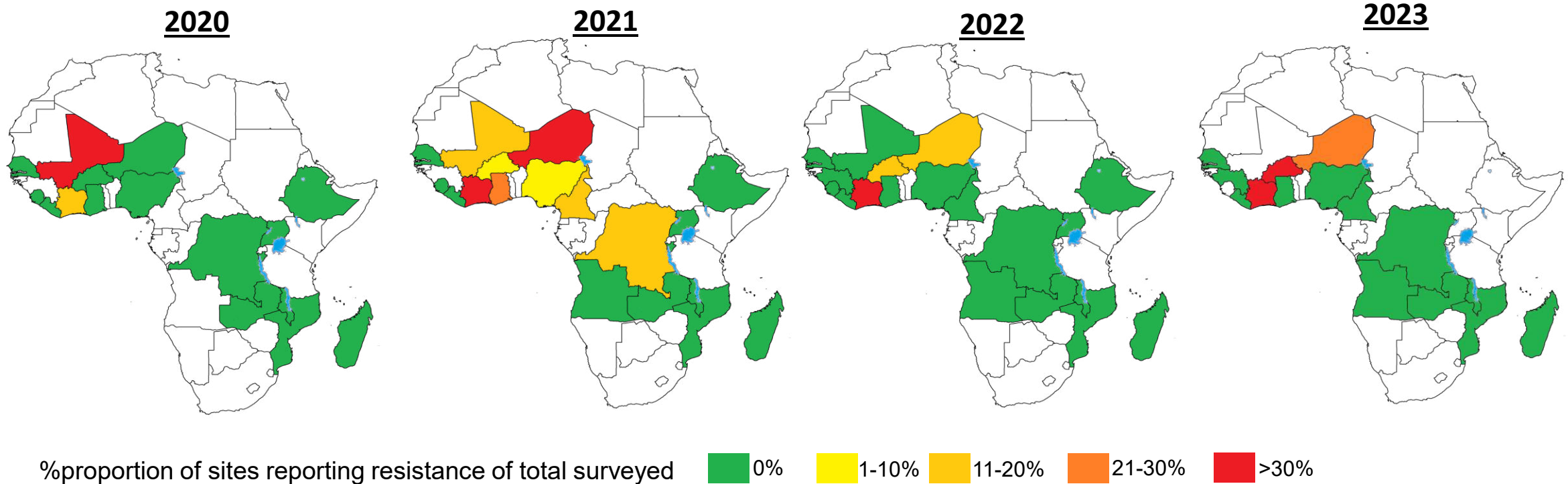
PMI Evolve
Evolving Vector Control to Fight Malaria

PMI VectorLink and PMI Evolve Data Collection Sites across Africa



- PMI Evolve is supporting National Malaria Programs (NMPs), PMI, as well as U.S. Agency for International Development (USAID) missions and bureaus with the planning, implementing, and monitoring of malaria vector control programs, including entomological monitoring, indoor residual spraying (IRS), insecticide treated nets (ITNs), and larval source management (LSM).
- The PMI Evolve project is working in 22 PMI partner countries.
- Entomological monitoring at sentinel sites provide NMPs with vector bionomics and insecticide resistance monitoring data.

Country Profile: Chlorfenapyr 100 µg/bottle



Chlorfenapyr 100ug/bottle insecticide susceptibility results <90% mortality cut-off at 72h

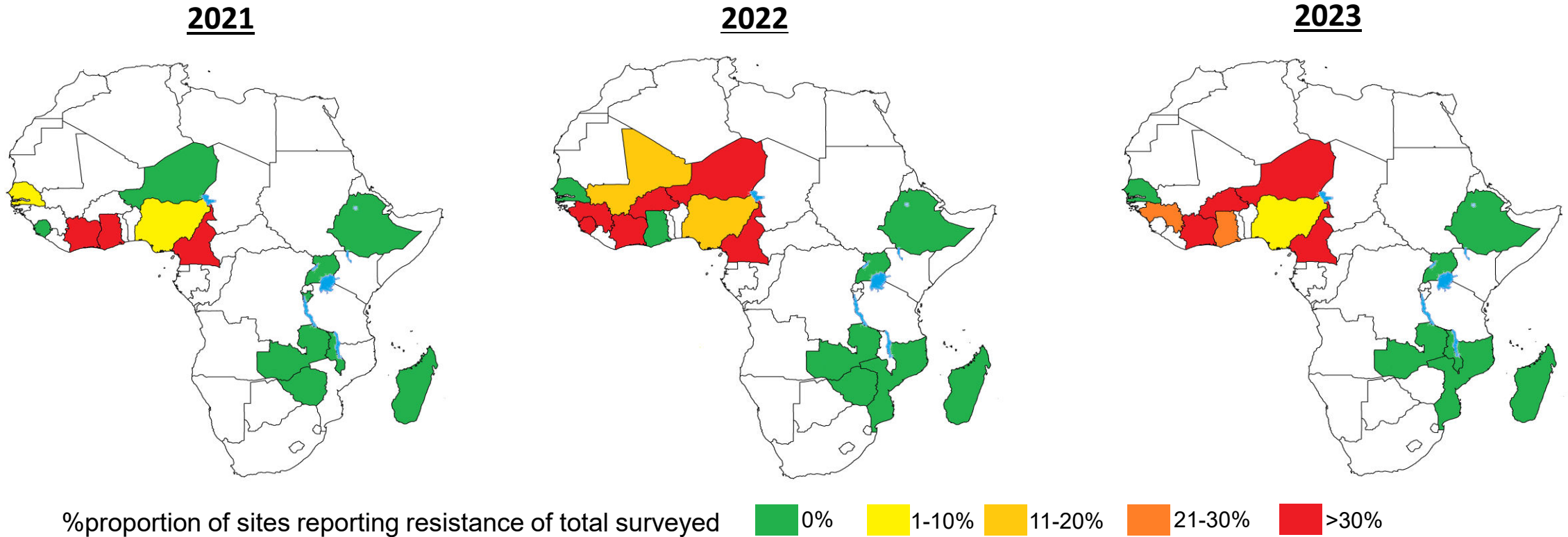
Cameroon: 2 sites reporting resistance in 2021 reported susceptibility in 2022, new sites tested in 2023

DRC: 1 site reporting resistance in 2021 reported susceptibility in 2022 and 2023

Ghana: 2 sites with resistance in 2021 reported susceptibility in 2022 and 2023

Malawi: 3 sites suspecting resistance in 2021 reported susceptibility in 2023

Country Profile: Clothianidin 4 µg/bottle

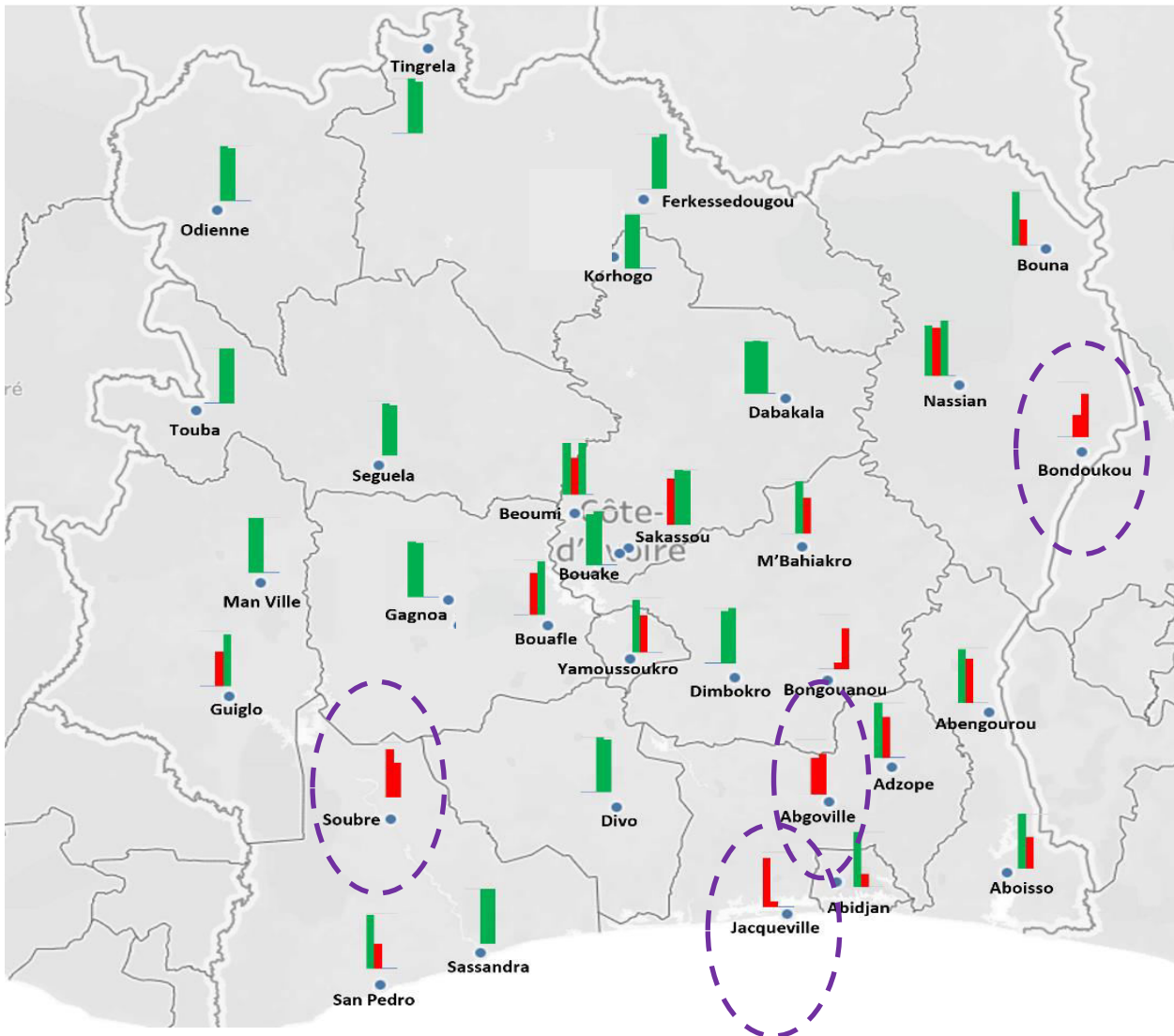


Clothianidin 4ug/bottle insecticide susceptibility results <98% mortality cut-off at 24h

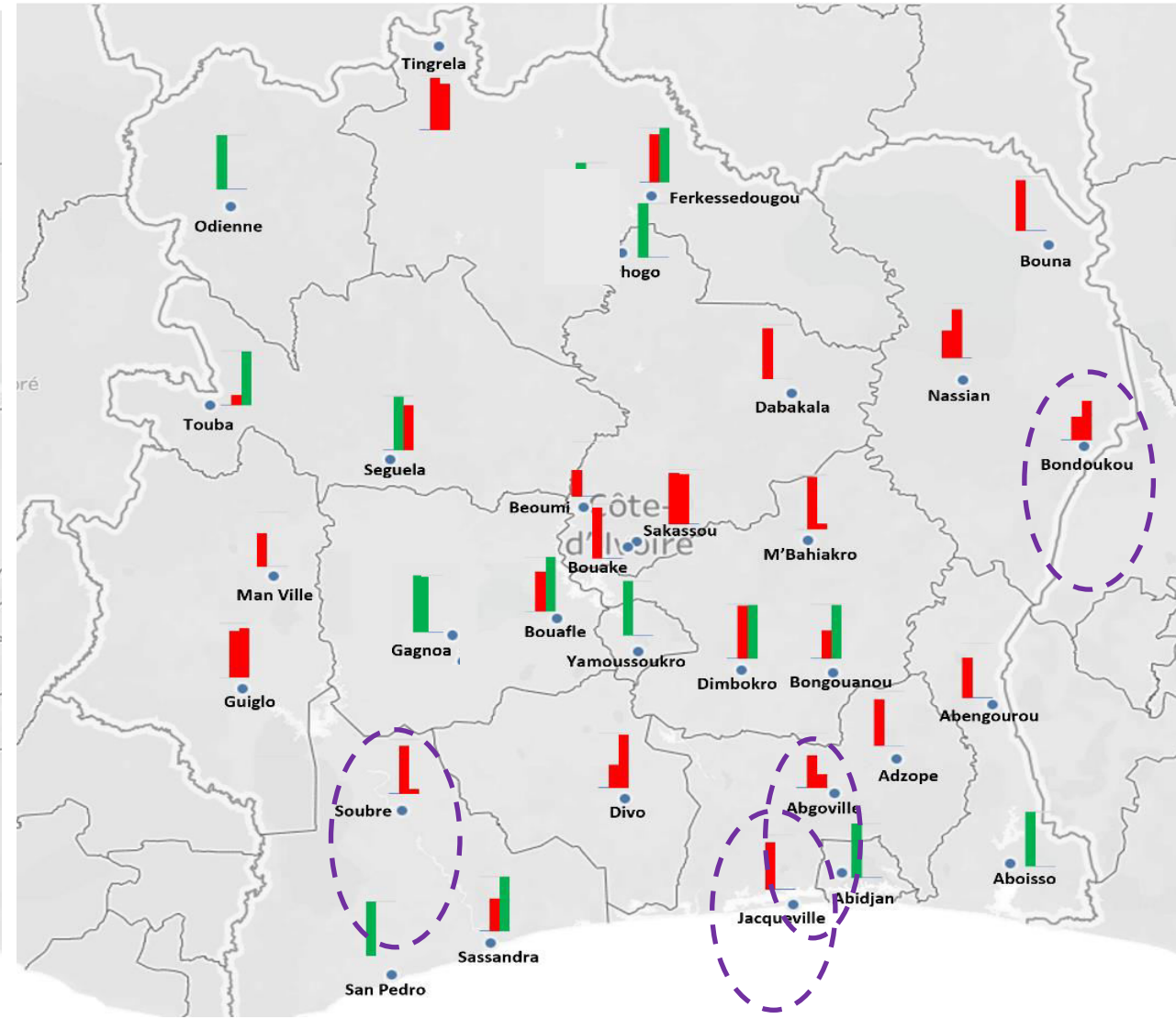
- Cote d'Ivoire and Cameroon reported resistance in about 30% of their sites all years
- Burkina Faso and Niger reported resistance in 2022 and 2023 in more than 30% of their surveyed sites
- Nigeria reported resistance between 1-10% in 2021 and 2023
- Ghana reported resistance in about 30% of the sites in 2021, same sites then reported susceptibility at next test (in either 2022 or 2023)

Within-country variability: Côte d'Ivoire Example

Chlorfenapyr Resistance: 2020-2023



Clothianidin Resistance: 2021-2023



Discussion and Takeaway

Chlorfenapyr

- Most countries are still showing susceptibility over time with eastern Africa showing consistent susceptibility over the years of review.
- Specific countries like Cote d'Ivoire consistently report resistance

Clothianidin

- Most west African countries reported resistance with increasing numbers of resistant sites over time. Also, eastern African countries were still susceptible all times
- All western African countries reported resistance for at least 1-10% of the sites except Senegal

Conclusion

- Clothianidin and chlorfenapyr may be newer insecticides for public health but they have been and are currently used in agriculture since the 1990s. In countries where agriculture represents the main commercial activities, mosquito resistance to these insecticides may develop/evolve more quickly.
- Seeing short lifetime of the new molecules to report resistance compared to previous insecticide classes.

Acknowledgements

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CENTERS FOR DISEASE CONTROL AND PREVENTION

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A clear plastic storage bin is filled with numerous mosquito traps. Each trap consists of a white mesh net stretched over a circular base. The bases are in various colors, including light blue, dark blue, pink, and purple. Many of the traps have several small, dark mosquitoes caught on the mesh. The traps are arranged in a somewhat haphazard manner within the bin.

Thank You!