Cape Saint Paul Wilt disease of coconut in Ghana: Surveillance and management of disease spread.

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Introduction

- Cape Saint Paul Wilt disease (CSPWD) is a lethal-yellowing type disease of coconut which has been in Ghana since 1932. It has destroyed thousands of ha of coconut plantings.
- Symptoms of CSPWD
  - Premature nut drop with or without yellowing of fronds
  - Blackening of immature inflorescences
  - Progressive yellowing or in some instances browning of the crown from the older leaves upwards
  - Crown turns all yellow, dries up and then falls leaving a bare trunk.
- Mode of spread:
  - Local spread
  - Jump spread

Introduction cont'd

- Various authors have reported on the epidemiology and spread of CSPWD in Ghana before 2000.
- Since 2000 surveys were conducted to ascertain the limit of spread of the disease. In 2006 & 2007 aerial surveys were employed for the first time.
- Management of the disease spread at Ampain focus.
- Monitoring of disease incidence in fields replanted with the hybrid, MYD x VTT.

The paper reports on these activities.

Materials & Methods cont'd

A 2-seater aircraft used in the survey.

- Aerial survey
- Waypoints of suspected diseased palms / foci spotted were taken from the aircraft with GPS. Recorded GPS waypoints were managed with MapSource software and verified by ground survey.
- Photographs were also taken during the flight.

Materials & Methods cont'd

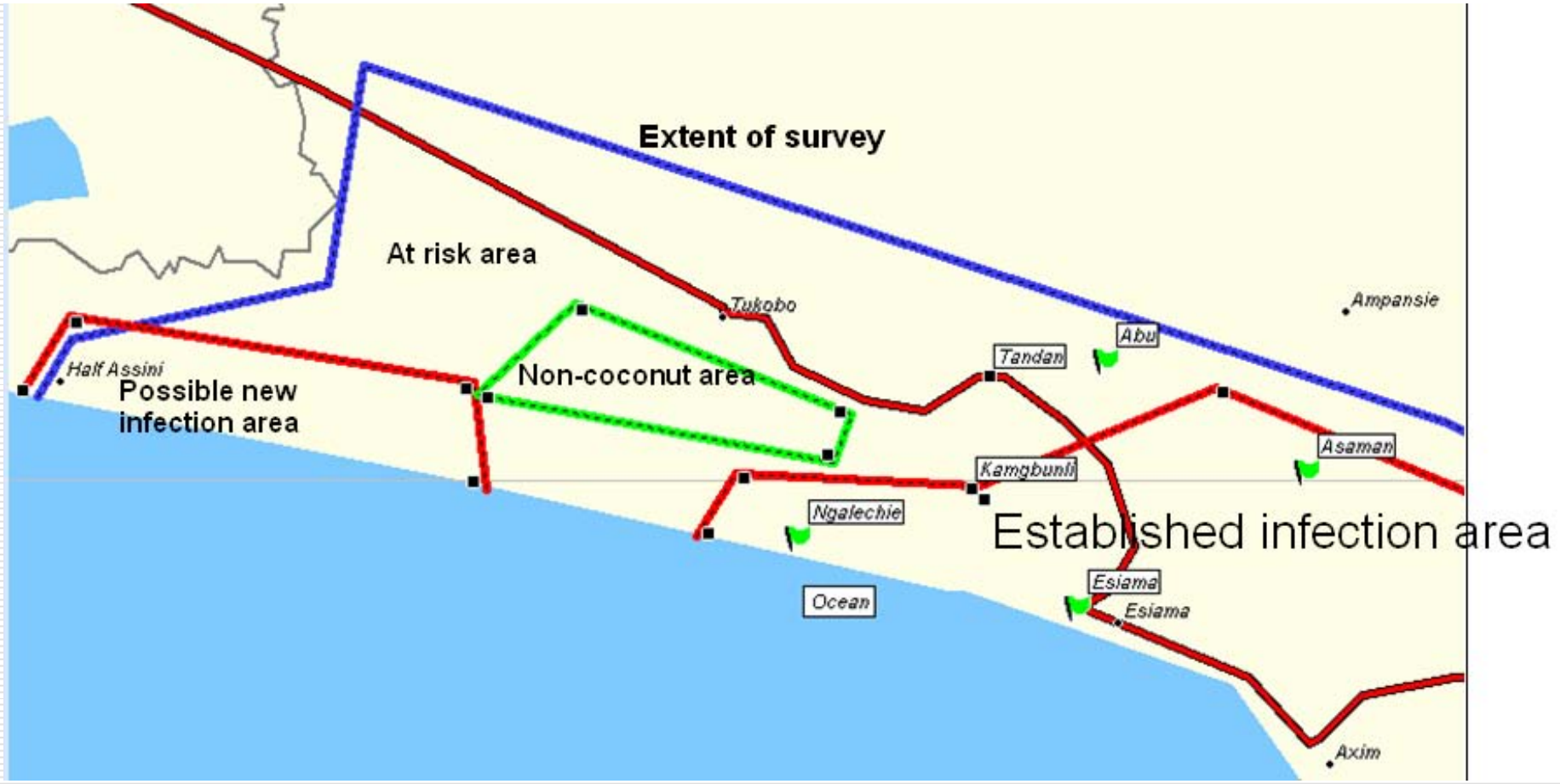
- Ground survey.
  - Extensive survey: Aimed at covering all the coconut growing areas - diseased and disease-free.
  - Intensive survey: Aimed at identifying spots and or individual diseased palms in an infected plantation or nearby healthy farms which are at risk of getting infected. 'Systematic walk through' method used.

Materials & Methods cont'd

- Replanted plots with the hybrid, MYD x VTT were monitored in 2006/7. First infection cases were confirmed by PCR analysis of stem-drilling /spear leaf/inflorescence samples.
- Disease management: Periodic/Monthly inspection of target focus at Ampain. All palms showing visible disease symptoms were felled with a chain saw machine, fronds pruned and trunk cut into pieces to facilitate quick drying.

Results

- Fig. 1. Area covered under aerial survey



Results cont’d

Established focus of CSPWD

‘Suspected’ incipient focus of CSPWD

Results cont'd

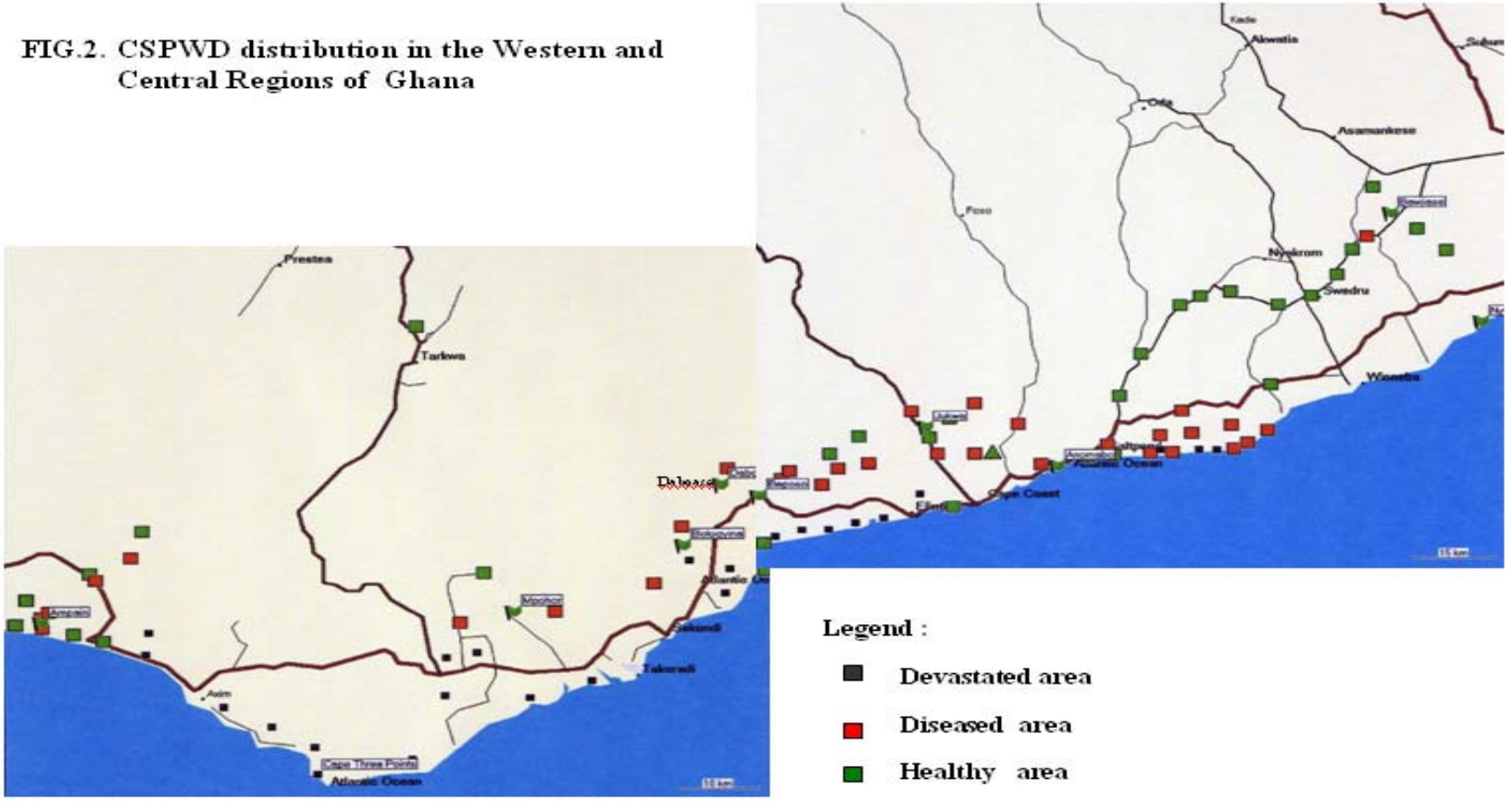
Suspected infected spot

- Two incipient foci were revealed by the 2006 aerial survey which were beyond the previously known limit of the disease spread.
- In the 2007 survey no new foci were found. PCR analysis of samples taken from spots with pronounced yellowing symptoms captured with GPS and identified by ground survey tested negative.

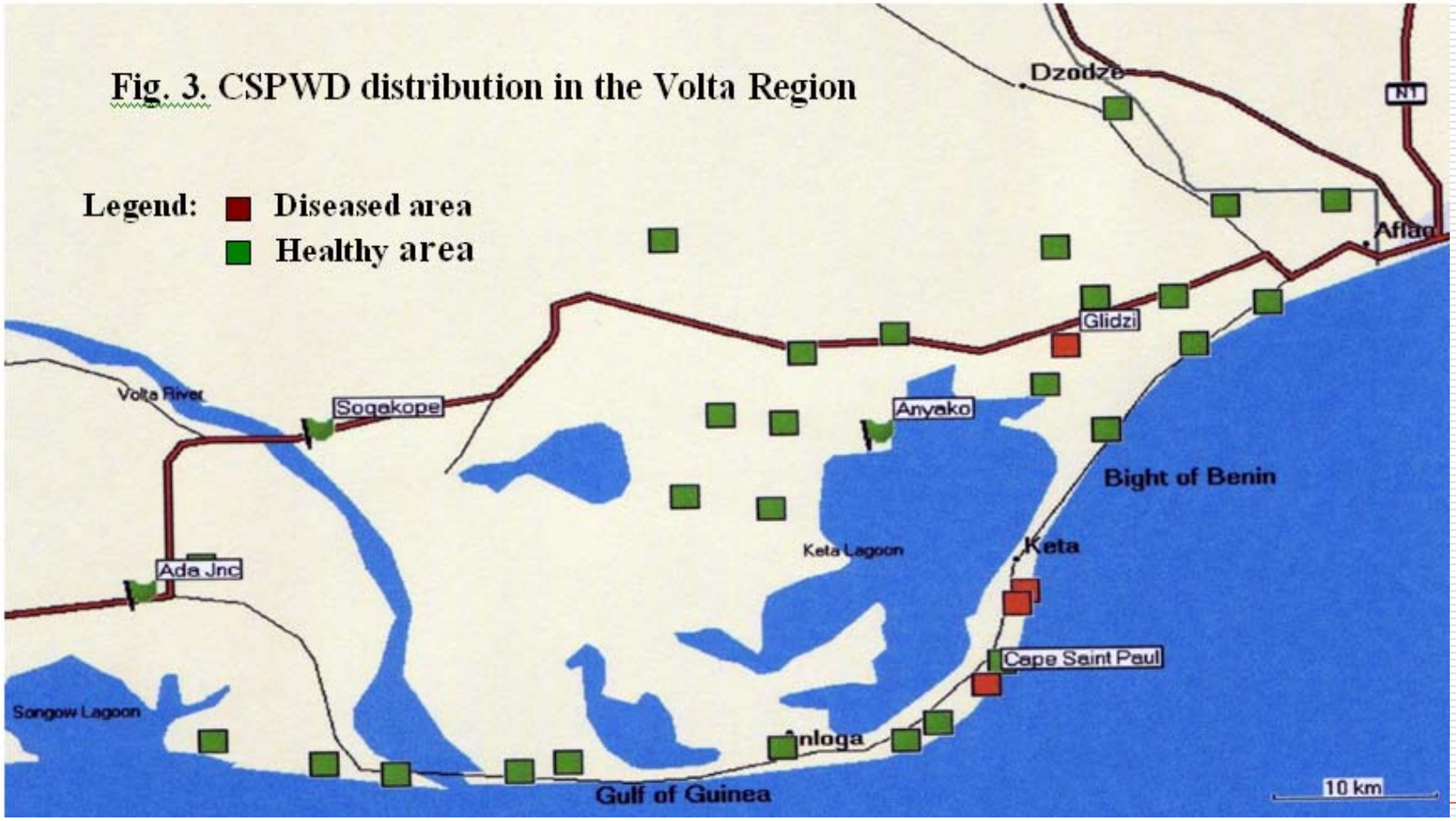
Results cont'd

Ground survey

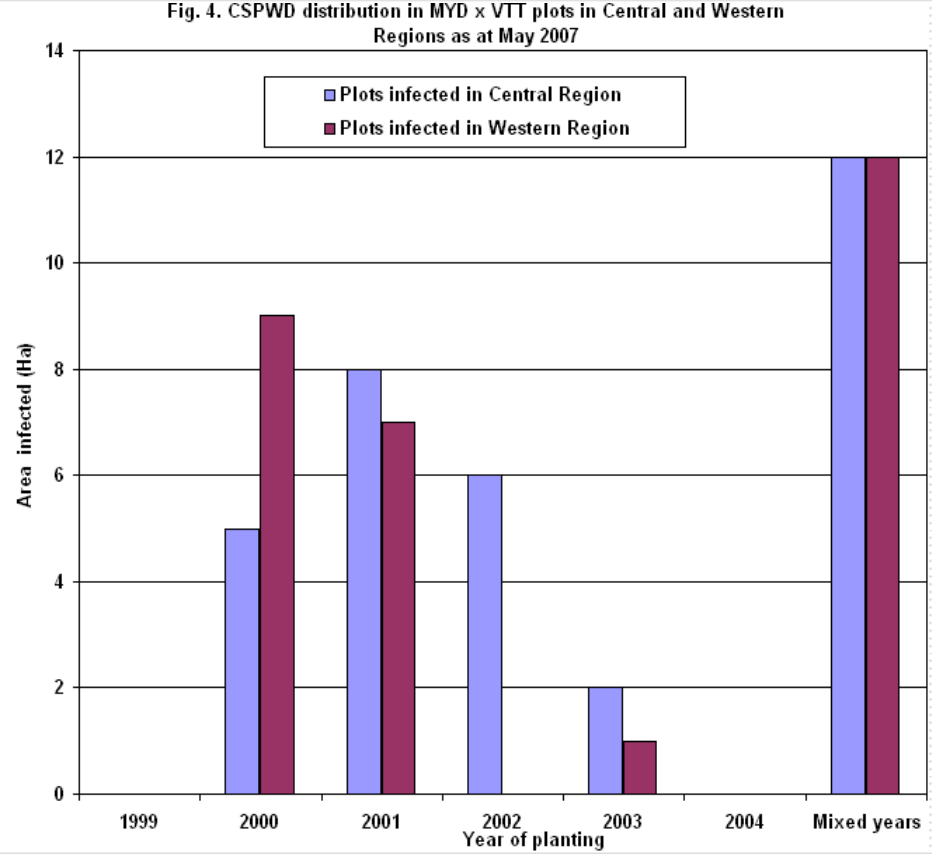
FIG.2. CSPWD distribution in the Western and Central Regions of Ghana



Results cont'd



Results cont'd



- 1300 ha replanted
- 1288 ha monitored
  - 359 ha in Central
  - 929 ha in Western
- 62 ha (4.8%) infected in the two regions, 33 ha in Central and 29 ha in Western.
- None of the 1999 (35 ha) & 2004 (196 ha) plantings was affected.

Results cont'd

- **Disease containment at Ampain focus**.

3800 trees covering about 25 ha surrounded the main focus identified in 1995. 70 % of the original stand has succumbed to the disease as at March 2008. A total of 1331 trees were removed by periodic felling since 1996.

- Disease spread around the initial point of infection has been very slow and is less than 1 km.

Discussion

- Aerial survey
  - Provides a quick view of the disease situation over a large area at a very short time.
  - Ability to spot and capture on GPS ‘suspected’ disease foci or palms.
  - Not foolproof in identifying all CSPWD infections unless backed by ground survey.
  - Very expensive.
- Half-yearly surveys recommended for monitoring the 18000 ha healthy plantings in the Jomoro district, west of Ampain.

Discussion cont'd

- Disease situation in the Volta Region is unique.
- Apparent disappearance of the disease after the major epidemic in the 60's & 70's.
- Replanting occurred in the 80's. Disease resurfaced in 1995. Since then its attack has been sporadic, less aggressive and losses very low compare to situations in the Central & Western regions.

Field Observations

- Prevalence of relatively drier conditions. Coconut mainly grows in sandy dry soils around the Keta lagoon and the narrow strip of land between the sea and the lagoon.

Discussion cont'd

- Development of settlements under the plantations.
- Low flora diversity and insects vector population (putative vectors) have been observed.
- Heterogeneity of coconut plant populations.

  Are these factors contributing to the variation in disease spread in the region?

- Investigation into the disease behaviour in the Volta region may be worth while.

Discussion cont'd

- Slow rate of spread of the disease at Ampain is attributed mainly to the containment exercise. Estimated rate of spread per year of CSPWD is 0.33 km from field observations . The spread around the Ampain focus is < 1 km for the past 14 years. Comparatively, the Asanta focus had expanded more than 3 km to the east, west and north.

  Although not rigorously practised the exercise had slowed down the spread of the disease further west of Ampain.

- Eradication must therefore be part of an integrated control strategy of CSPWD.

Discussion cont'd

- The disease attack on the MYD x VTT hybrid in replanted fields appears low for now . However, it has revealed the susceptibility of the hybrid to high disease pressure as observed in the fields, particularly of Central region.
- The hybrid because of its favourable agronomic performances should be given preference in areas of low disease risk (Dery *et al*. 2008).

THANK YOU