

PROFILE MONITORING OF INSECTICIDE RESISTANCE IN INDONESIA

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PROFILE OF INDONESIA

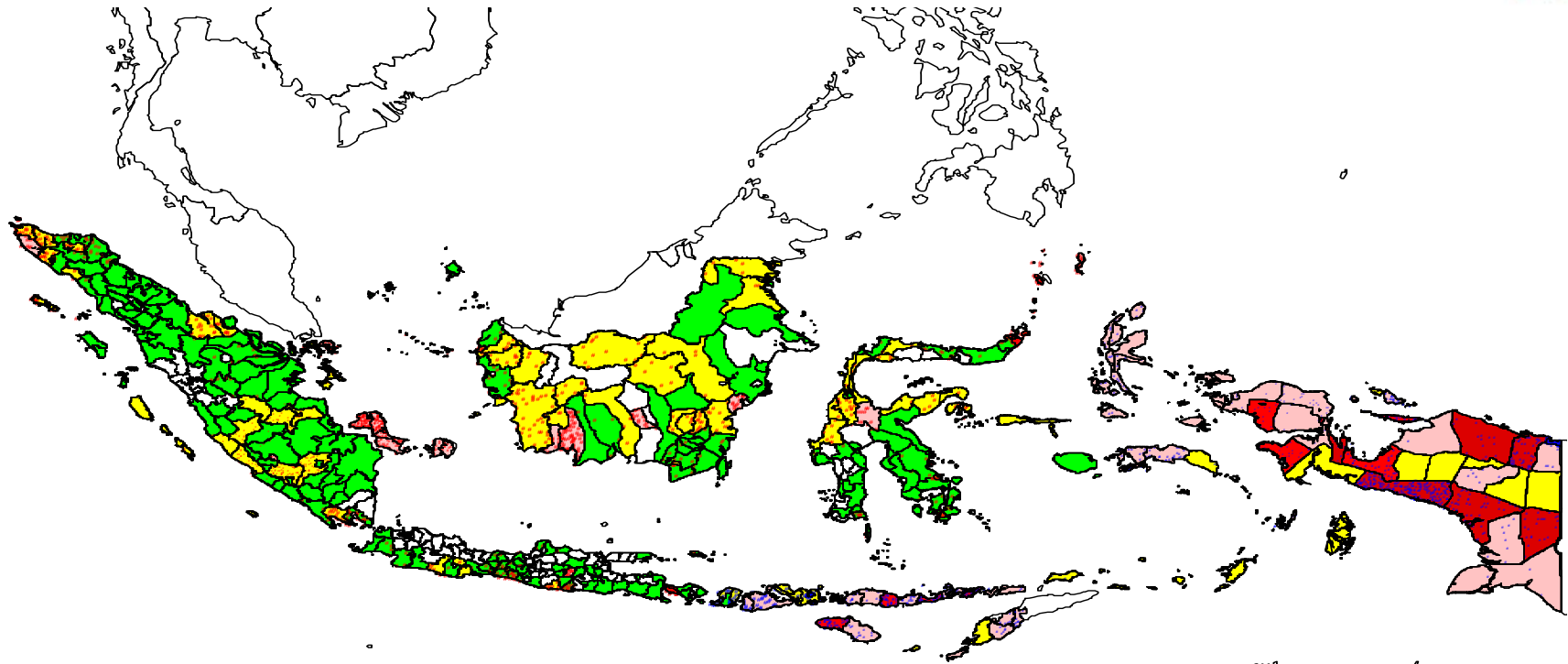


- No. of Islands : 17.000
- Population : 227 million
- Area : 1.100 x 1500 miles sqr
- No. of Province : 33
- No of District : 430
- Life Expectancy : 67 year

Top Ten Health Problem Priority:

- | | |
|-----------------|-------------------------|
| 1. Malaria | 6. ARI |
| 2. Tuberculosis | 7. Leprosies |
| 3. HIV AIDS | 8. Immunization |
| 4. DHF | 9. Diarrhea |
| 5. Filariasis | 10. Reproductive Health |

MAP ENDEMISITAS MALARIA TH. 2007



API
o/oo

0
Free

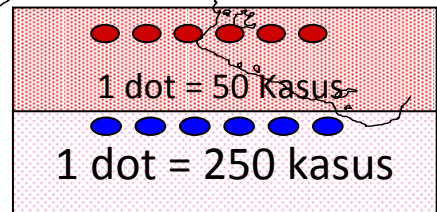
0-1
Low

1-5
Moderate

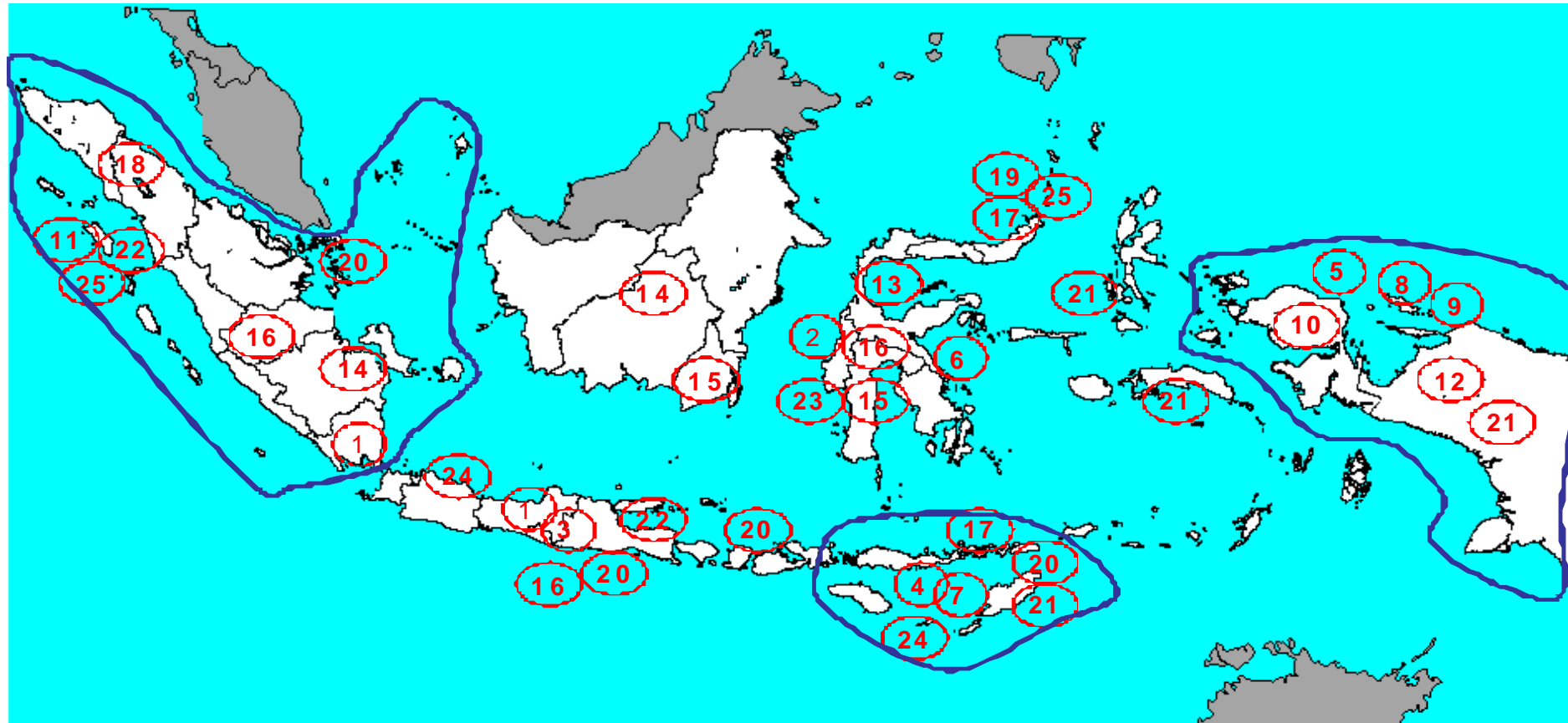
5-49

50-100
High

>100



DISTRIBUTION OF MALARIA VEKTOR IN INDONESIA



Keterangan :

- 1 *An.aconitus*
- 2. *An.balabacensis*
- 3. *An.bancrofti*
- 4. *An.barbirostris*
- 5. *An.farauti*
- 21 *An.tesellatus*
- 25. *An.annularis*

- 6. *An. flavirostris*
- 7. *An. koliensis*
- 8. *An. letifer*
- 9. *An. leucosphyrus*
- 10. *An. karwari*
- 22. *An. parangensis*

- 11 *An. ludlowi*
- 12. *An. maculates*
- 13. *An. minimus*
- 14. *An. nigerrimus*
- 15. *An. punctulatus*
- 23. *An. kochi*

- 16. *An. sinensis*
- 17. *An. .subpictus*
- 18 *An. sundaicus*
- 19. *An. vagus*
- 20. *An. umbrosus*
- 24. *An. ludlowi*

LOCATION OF INSECTICIDE RESISTANCE SENTINEL SITE

MTC (Bill Gat e Foundation Support):

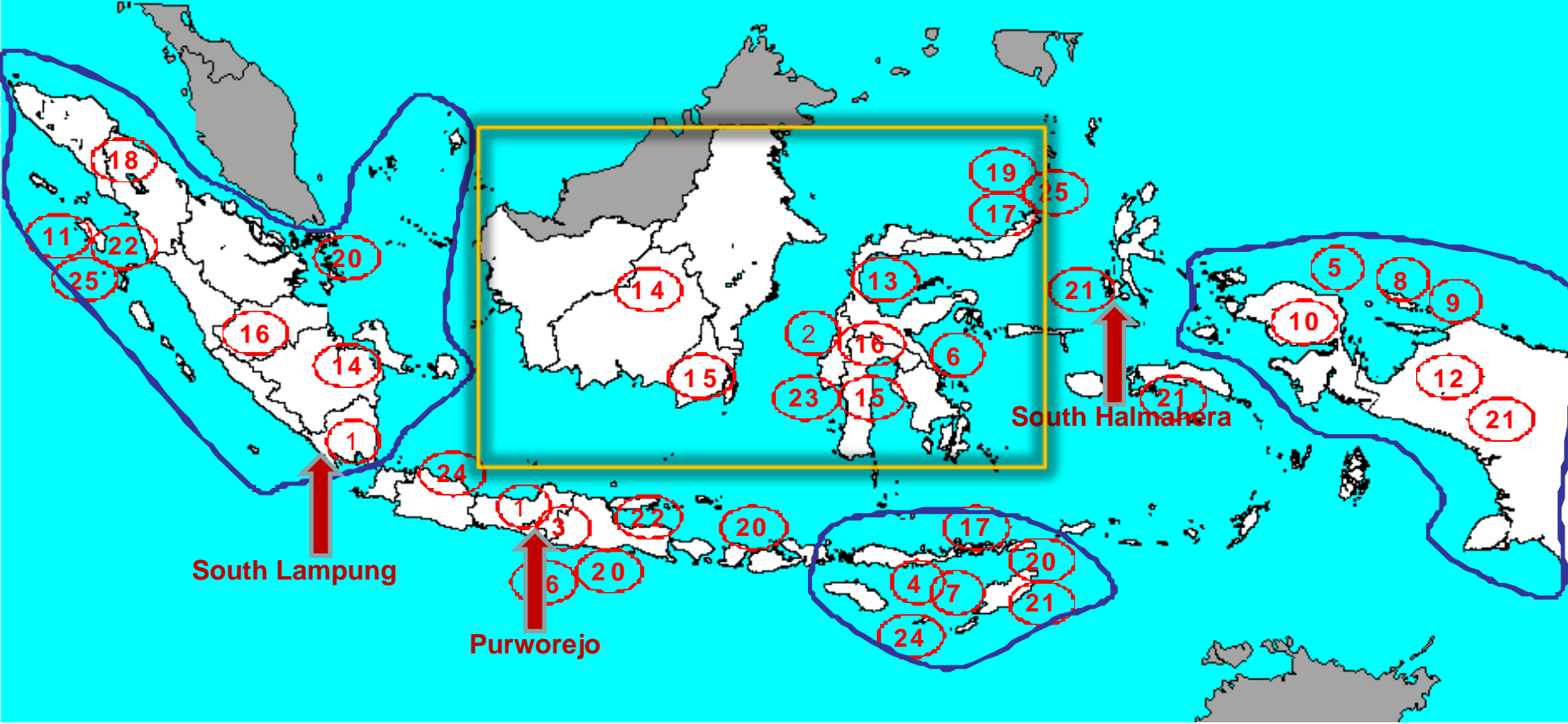
- Purworejo (Central Java Province)
- South Lampung (Lampung Province)
- South Halmahera (North Maluku Province)

Next Round 8 GF Malaria Support:

- 4 Sentinel Site propinces in Kalimantan
- 6 Sentinel Site provinces in Sulawesi

Sampling Site IRM Government Support:

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- | | | | |
|----------------------------|----------------------------|----------------------------|--------------------------|
| 1. <i>An.aconitus</i> | 6. <i>An. flavirostris</i> | 11. <i>An. ludlowi</i> | 16. <i>An. sinensis</i> |
| 2. <i>An. balabacensis</i> | 7. <i>An. koliensis</i> | 12. <i>An. maculates</i> | 17. <i>An. subpictus</i> |
| 3. <i>An. bancrofti</i> | 8. <i>An. letifer</i> | 13. <i>An. minimus</i> | 18. <i>An. sundaicus</i> |
| 4. <i>An. barbirostris</i> | 9. <i>An. leucosphyrus</i> | 14. <i>An. nigerrimus</i> | 19. <i>An. vagus</i> |
| 5. <i>An. farauti</i> | 10. <i>An. karwari</i> | 15. <i>An. punctulatus</i> | 20. <i>An. umbrosus</i> |
| 21. <i>An. tessellatus</i> | 22. <i>An. parangensis</i> | 23. <i>An. kochi</i> | 24. <i>An. ludlowi</i> |
| 25. <i>An. annularis</i> | | | |

Detection of Insecticide Resistance

- Bioassays WHO test:

- 3-5 days old non-blood adult females, 25°C 80% RH
- Discriminating concentration 1h exposure:

DDT 4%	Permethrin 0.75 (pr 0.25%)
Malathion 5%	Deltamethrin 0.05%
Propoxur 0.1%	Lambda cyhalothrin 0.005%
Bendiocarb 0.1%	Alpha cypermethrin 0.025%

- Mortality after 24h; KD50 , KD95
- 98-100% Susceptible, 80-97 Suspected R, < 80% Resistance

- Biochemical tests:

- AChE, esterase, G-S-transferase, monooxygenases assays.
- Fresh or frozen samples; reference strain.

- Molecular detection

- *Kdr* gene, *Ace.1^R*

SUSCEPTIBILITY TEST (2008-2009) IN THE 3 SENTINEL SITE

SITE	SPECIES	INSECTICIDE TESTED	N (mortality) (%)	STATUS
LAMPUNG S.Lampung, Rajabasa, Waymuli	<i>An.sundaicus</i>	Deltamethrin 0,05%	75 (100 %)	Susceptible
		Bendiocarb 0,1 %	84 (94,5 %)	Tolerance
		Permethrin 0,25%	75 (95 %)	Tolerance
		DDT 4%	77(27,7%	Tolerance
		Cypermethrin0.05%	77(17.95%)	Tolerance
		Alfacypermethrin 0.005%	78(17.8%)	Tolerance
CentralJava Purworejo	<i>An.barbirostris</i>	Cypermethrin 0,05%	84 (72 %)	Tolerance
		Cypermethrin 0,05%	91 (79 %)	Tolerance
	<i>An.maculatus</i>	Permethrin 0.75%	72 (88%)	Tolerance
		DDT 4 %	85 (87%)	Tolerance
HALSEL	<i>An.kochi</i>	Permethrin 0,75%	52(100%)	Susceptible
	<i>An.vagus</i>	Permethrin 0,75%	93 (100%)	Susceptible

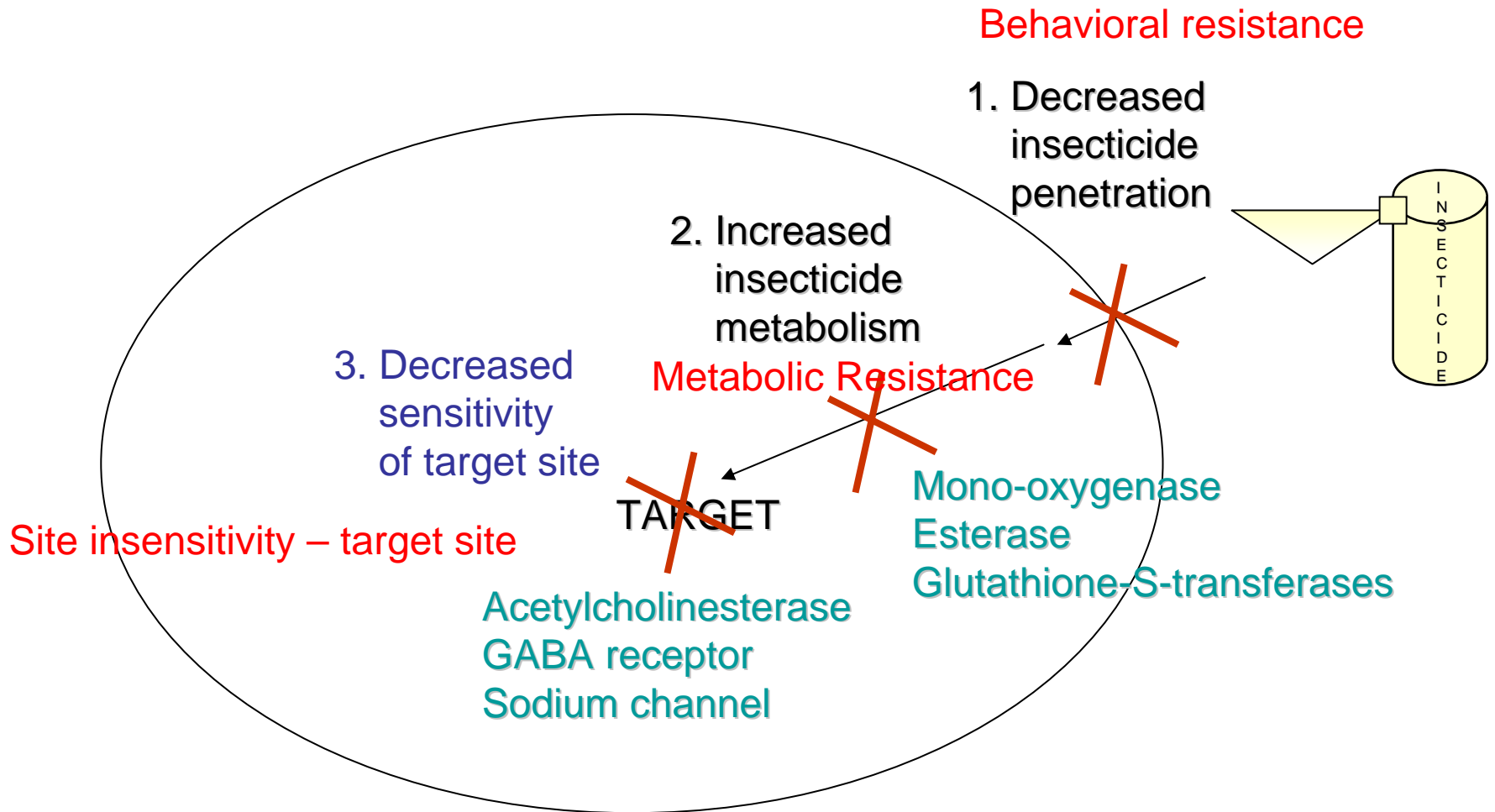
**INSECTICIDE RESISTANCE STATUS FOR MALARIA VECTOR
IN SAMPLING SITE IN INDONESIA 2007**

No.	Province	Species tested	Insecticide	Mortality	Status
1	Sulawesi Tenggara, Kab Konawe, Kec Wawonii Barat, Desa Langara Wiwawo	An.subpictus	cypermethrin 0,05%	100%	Susceptible
2	Sulawesi Tenggara, Kab Konawe, Kec Wawonii Barat, Desa Langara Wiwawo	An.subpictus	Lambda cyhalotrin 0,05%	100%	Susceptible
3	DIY, Kab Kulonprogo, Kec Kokap, Desa Kalirejo	An.Maculatus	Bendiocarb 0,1 %	100%	Susceptible
4	Jatim, Kab Jember, Kec Tempur Rejo, Kel Bande Alit	An.sundaicus	Bendiocarb 0,1 %	100%	Susceptible
5	NAD, Kab Banda Aceh	An.subpictus	Lambda cyhalotrin 0,05%	96%	tolerant

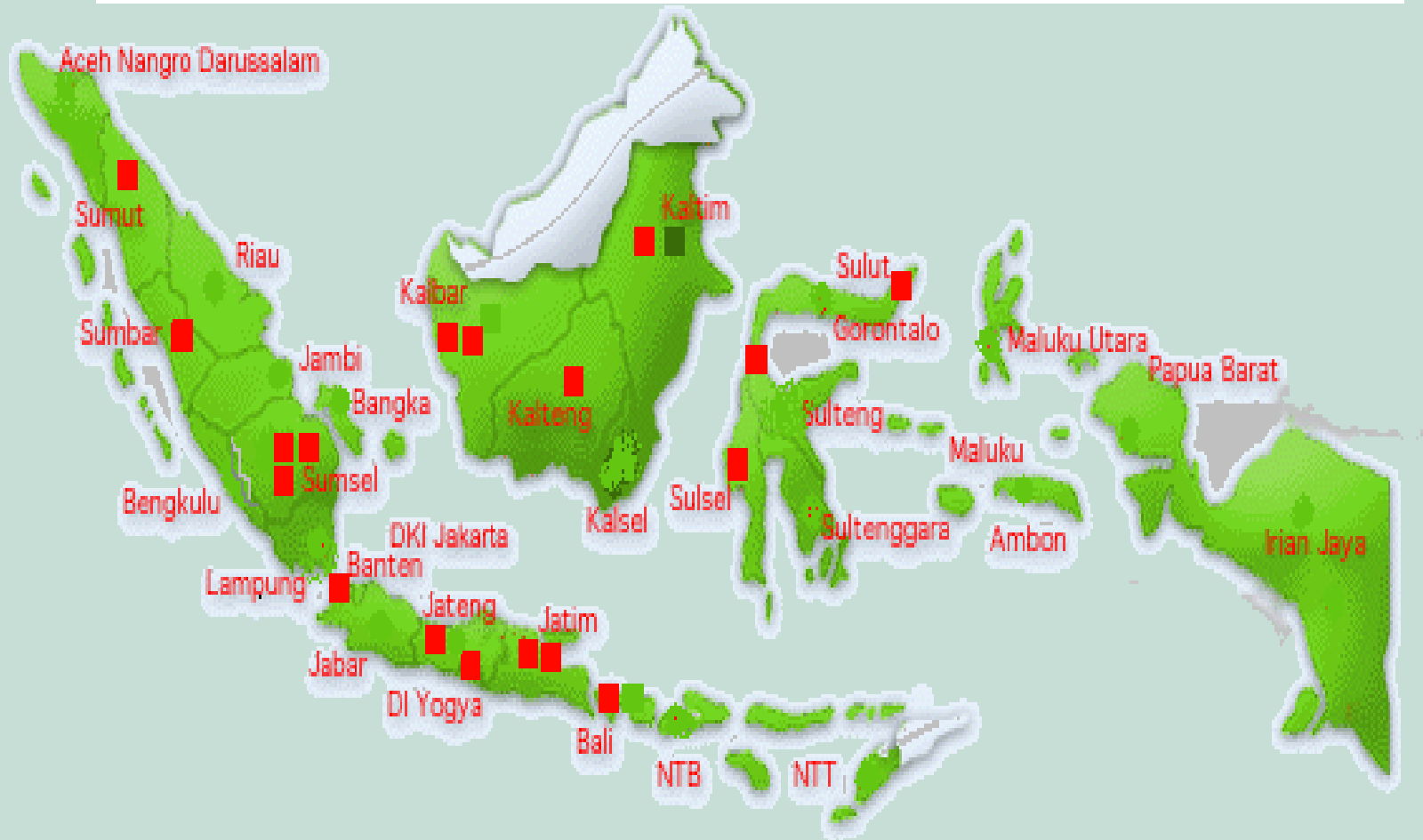
**INSECTICIDE RESISTANCE STATUS FOR MALARIA VECTOR
IN SAMPLING SITE IN INDONESIA 2008**

No.	Province	Species tested	Insecticide	Mortality	Status
1	NTT, Kupang, desa Lifuleo	An. barbirostris	Bendiocarb 0,1%	85-95%	tolerant
2	NTT, Kupang, desa Lifuleo	An. subpictus	Bendiocarb 0,1%	85-90%	tolerant
3	Papua Barat, Kab Manokwari, Kel Kabori	An.farauti	Bendiocarb 0,1%	100%	Susceptible
4	Papua Barat, Kab Manokwari, Kelurahan Pravimulya	An.punctulatus	Bendiocarb 0,1%	100%	Susceptible
5	Lampung, Kab Lampung Selatan, Kec Rajabasa, Desa Waymuli	An.sundaicus	Deltamethrin 0,05%	100%	Susceptible

Mechanisms of insecticide resistance



SITUATION OF RESISTANCE STATUS OF Aedes Aegypti WITH MALATHION 0.8 % IN INDONESIA UNTIL 2009



- --- Rentan
- --- Toleran
- --- Resisten

MATERIAL AND METHODS

- Local malaria vectors
- Adult (female)
- Abdominal condition (sugar fed, unfed, bloodfed)
- Homogen (species and age) ranges (3 – 5 days)
- Sampel base on larva reared

SAMPLE SIZE

- Each species of 75-100 adult mosquitos
- 4 replicates if it's possible, each species per each group insecticide.

Anopheles is more likely found in :

59% Breeding Place with direct sunlight, but only 35% in lee



Breeding place is most often found in Songa Springs



Lemolemo:

Lagoon formed behind
Sandbar

There is springs water on river below



Breeding site salinity testing



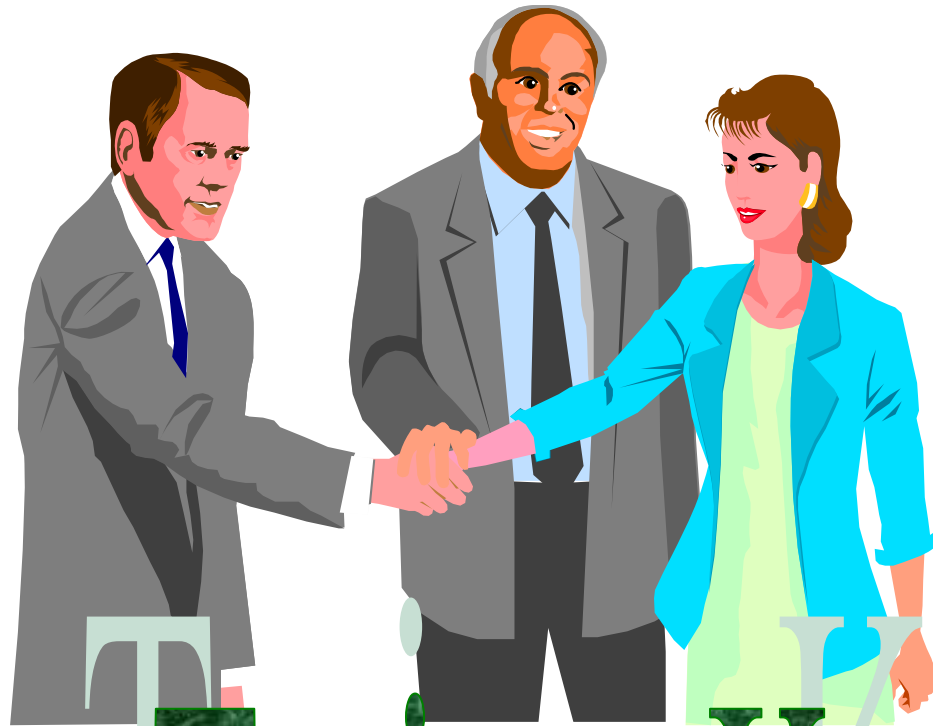


SUSCEPTIBILITY TEST TREATMENT



AFTER IDENTIFICATION





Terima Kasih