Mitigation methods that are not considered best practice



20 Feb 2024

WCPFC CMM 2018-03 includes several methods that are not considered best practice

North of 23° N require the following mitigation options

(1 for small (<24 m) vessels, 2 for large vessel):

Column A	Column B
Side-setting with a bird curtain and weighted branch lines[1]	Tori line[2]
Night setting with minimum deck lighting	Blue-dyed bait
Tori line	Deep setting line shooter
Weighted branch lines	Management of offal discharge
Hook-shielding device[1]	

[1] This option counts as two mitigation measures.

[2] If a tori line is selected from both Column A and Column B, this equates to simultaneously using two (i.e. paired) tori lines.

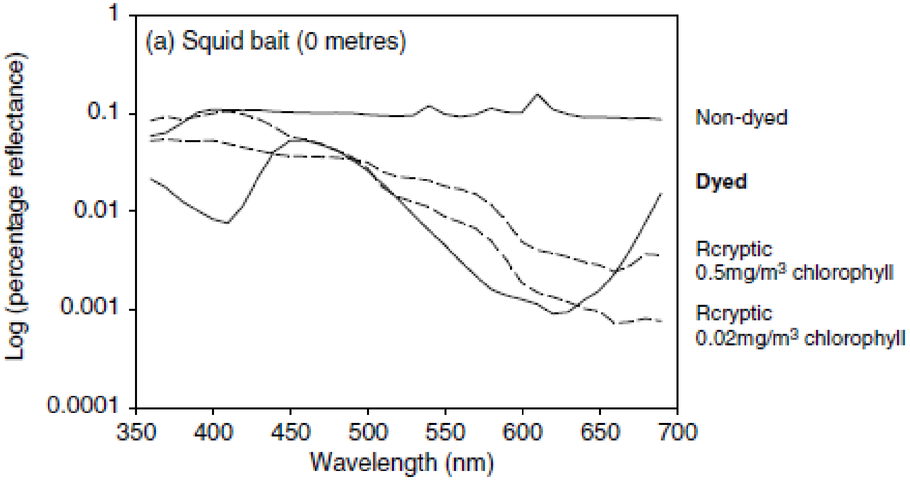
Blue-dyed bait

Basics:

- Blue-dyed bait is hypothesised to make bait less visible to seabirds and therefore reduce bycatch risk
- However, bait must be fully thawed and soaked in dye to achieve the appropriate level of darkness

Fig. 2. Bait is completely thawed and dyed blue by soaking in a large tub with dissolved blue food coloring to achieve regulatory-required darkness

Gilman et al. 2008

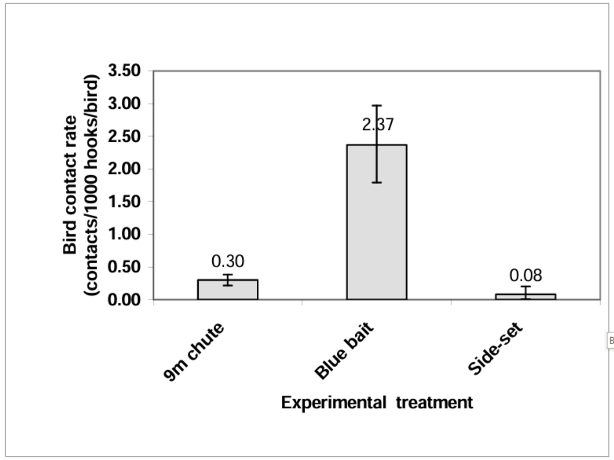


Cocking et al. 2008

Blue-dyed bait

Effectiveness:

- Gilman et al. 2003 highlighted that blue-dyed bait is inconsistently effective, dependent on weather, and that other methods are more effective (in Hawai'i)



Blue-dyed bait

Fig. 7. Contact rates (contacts/1000 hooks/bird) for experimental treatments used with swordfish gear for combined Laysan and black-footed albatrosses. Error bars are boostrapped (n = 1000) 95% nonparametric confidence intervals.

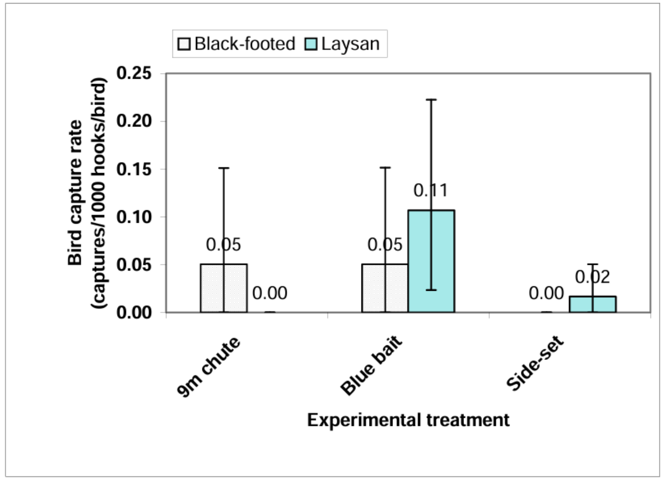
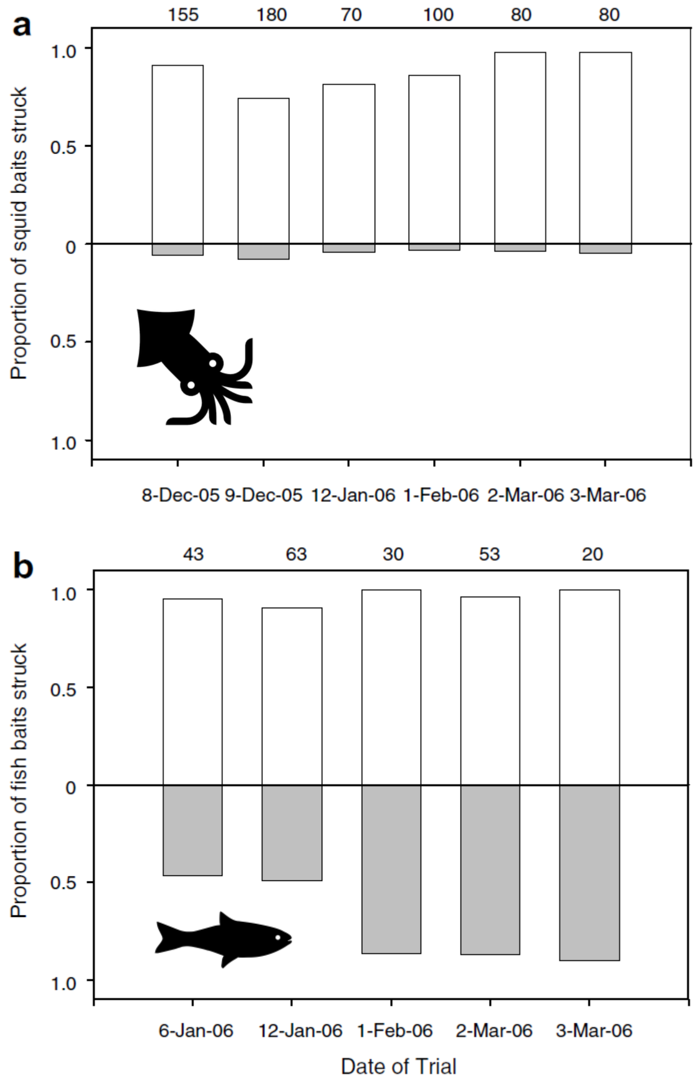


Fig. 8. Laysan and black-footed albatross capture rates (captures/1000 hooks/bird) for experimental treatments used with swordfish gear. Captures are based on the number of birds hauled aboard and not the number of birds observed captured during the set. Error bars are boostrapped (n = 1000) 95%

Blue-dyed bait

Effectiveness:

- Gilman et al. 2003 highlighted that blue-dyed bait is inconsistently effective, dependent on weather, and that other methods are more effective (in Hawai'i)
- Cocking et al. 2008, showed that birds will still strike blue-dyed fish bait (in Australia)
- Gilman et al. 2008 showed that side-setting is more effective in mitigating bycatch than blue-dyed bait (in Hawai'i)



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- Ochi et al. 2011 illustrate that bycatch could be reduced by blue-dyed bait, in particular squid bait (in South Africa)

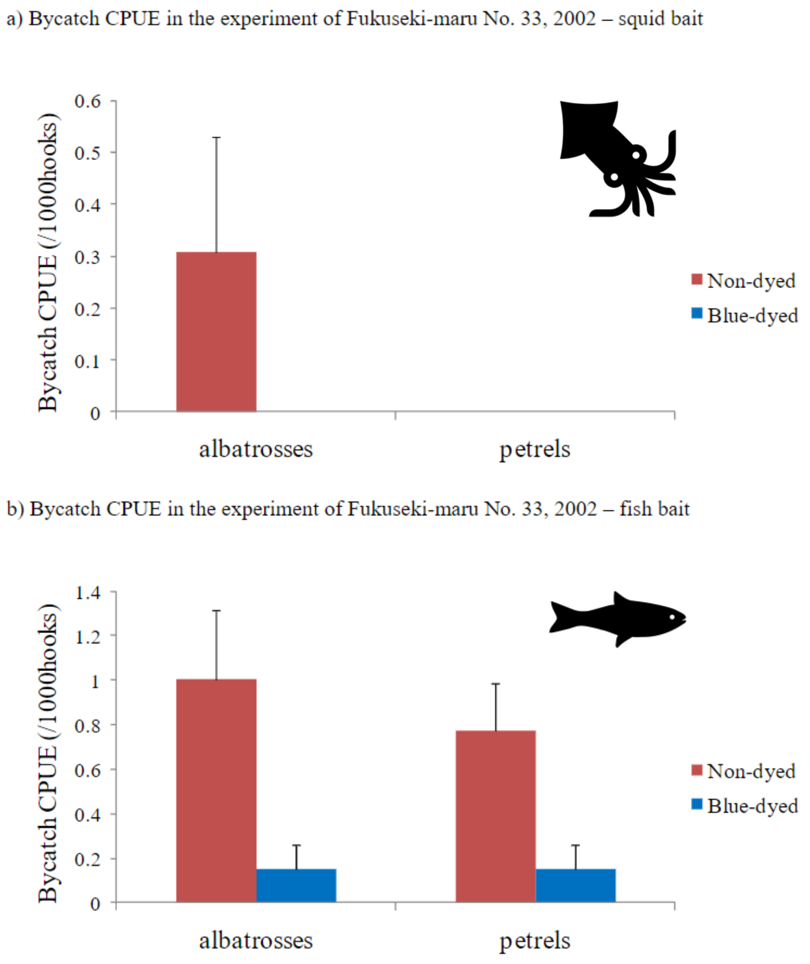

Figure 2. Catch rates (number of catch/1,000 hooks) of seabirds using blue-dyed squid (above) and fish (below) baits in Southern Bluefin Tuna longline fisheries off South Africa in 2002. Error bars indicate standard errors.

Ochi et al. 2011

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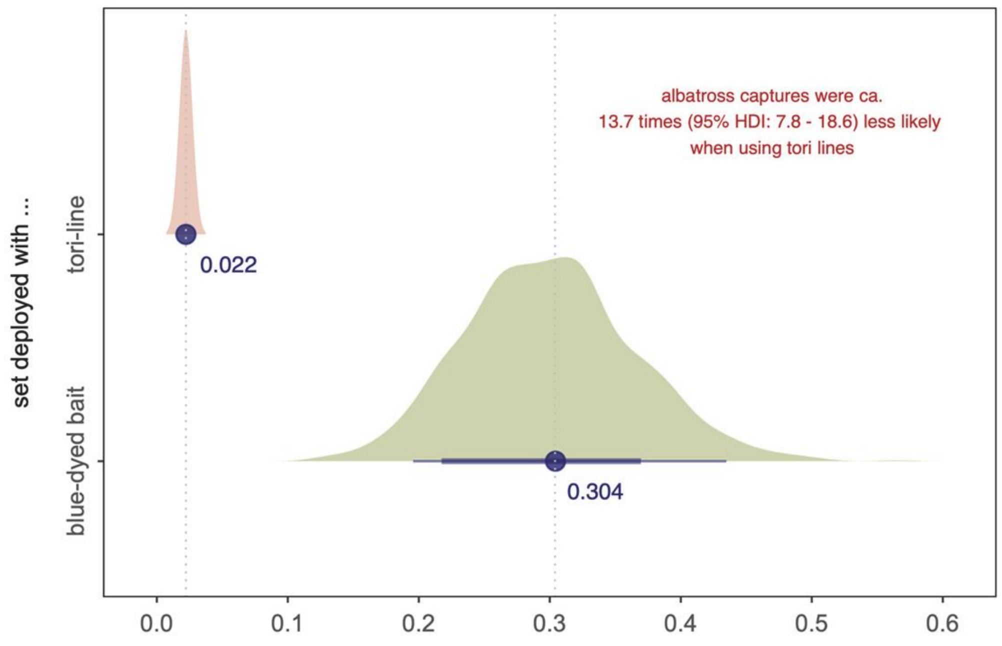
- Gilman et al. 2008 showed that side-setting is more effective in mitigating bycatch than blue-dyed bait (in Hawai'i)
- Ochi et al. 2011 illustrate that bycatch could be reduced by blue-dyed bait, in particular squid bait (in South Africa)
- Gilman et al. 2022 show through a very thorough study that tori lines are 14 times more effective in preventing bycatch than blue-dyed bait (in Hawai'i)



Gilman et al. 2022

Blue-dyed bait

Blue-dyed bait is generally perceived as impractical as:

- The extra time is required to thaw bait and then dye it (at least 20 min for dyeing)
- The thawed bait increased bait loss
- The thawing process decreases bait quality (and challenges reuse if a set is aborted)
- Onboard thawing and dyeing requires additional on-board labour
- Thawing and dyeing is challenging in poor weather

(Gilman et al. 2007, 2008, ACAP 2023)

Fig. 2. Bait is completely thawed and dyed blue by soaking in a large tub with dissolved blue food coloring to achieve regulatory-required darkness

Gilman et al. 2008

Blue-dyed bait

Effects on target catch:

- Gilman et al. 2003 illustrated that blue-dyed bait did not influence catch rate (of either tuna or swordfish in Hawai'i)
- Ochi et al. 2011. showed that blue-dyed squid and fish bait decreased catch rate (of southern bluefin tunas in South Africa)

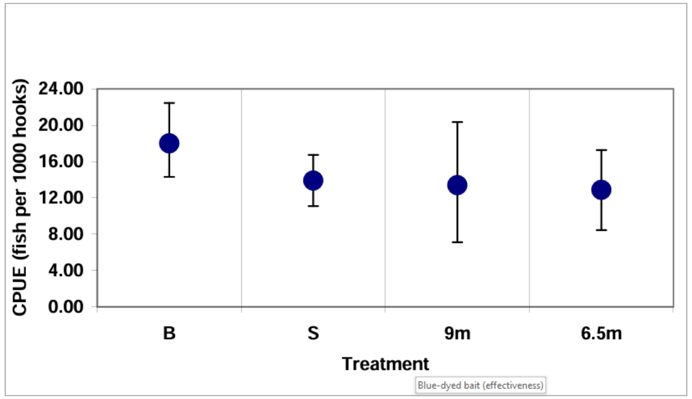
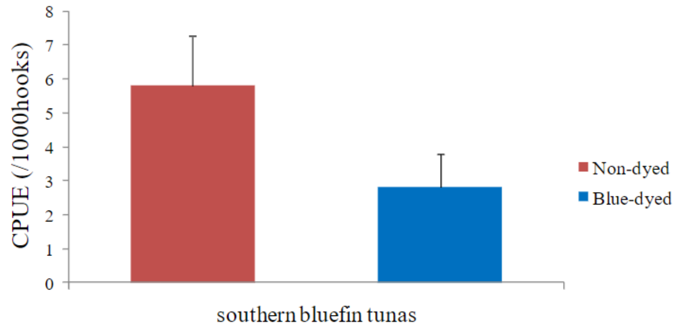


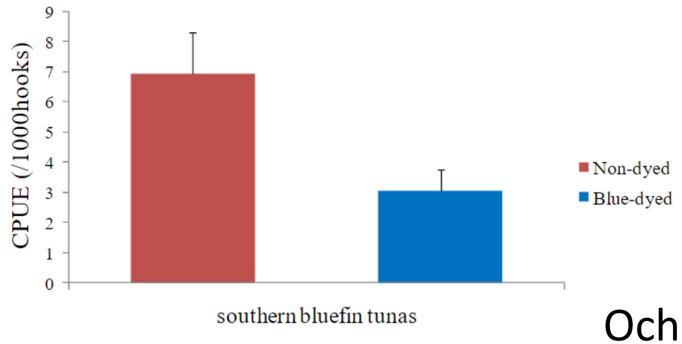
Fig. 16. CPUE for total commercial fish species for the four experimental treatments employed in the second research fishing trip, which employed longline tuna gear. Error bars are bootstrapped (n=1000) 95% nonparametric confidence intervals. B = blue-dyed bait, S = side set, 9m = 9m underwater setting chute, and 6.5m = 6.5m underwater setting chute.

Gilman et al. 2003

a) CPUE of southern bluefin tuna in the experiment of Fukuseki-maru No. 33, 2002 – squid bait



b) CPUE of southern bluefin tuna in the experiment of Fukuseki-maru No. 33, 2002 – fish bait



Ochi et al. 2011

Blue-dyed bait

Considering that:

1. Blue-dyed bait has not been proven to be effective as a bycatch mitigation method in the WCPO,
2. Other bycatch mitigation methods are proven to be (vastly) more effective,
3. Blue-dyed bait is generally perceived as an impractical method, and
4. Blue-dyed bait may decrease target catch rate,

Fig. 2. Bait is completely thawed and dyed blue by soaking in a large tub with dissolved blue food coloring to achieve regulatory-required darkness

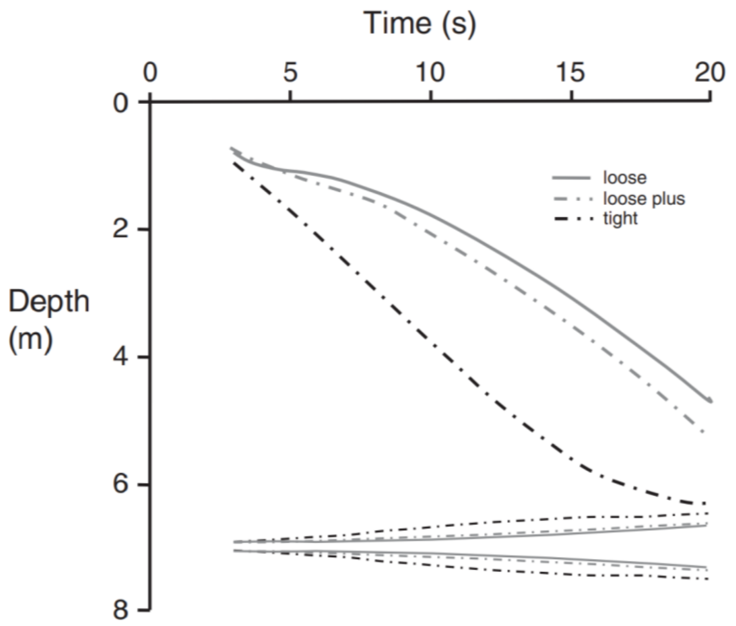
Gilman et al. 2008

Is there any evidence from the WCPO that indicates that blue-dyed bait is an effective seabird bycatch mitigation method?

Deep setting line shooter

- Line shooters deploy mainlines at speeds faster than the vessel speed
- Line shooters remove tension, allowing the mainline to enter the water immediately astern of the vessel, rather than ~30 m behind the vessel
- Variation in tension and propeller turbulence slow sink rate of hooks, causing seabird bycatch risk to <u>increase</u>
- No clear evidence for effectiveness of line shooters in reducing seabird bycatch appears to exists

Is there any scientific evidence indicating that deep setting line shooters are an effective bycatch mitigation option?



Robertson et al. 2010

Management of offal discharge

Offal discharge can attract seabirds to vessels and puts them at risk of bycatch

Thus, offal discharge management is often perceived as beneficial.

Definition of management of offal discharge as per CMM 2018-03:

1. Either no offal discharge during setting or hauling;
2. Or strategic offal discharge from the opposite side of the boat to setting/ hauling to actively encourage birds away from baited hooks.

Management of offal discharge is only part of the Northern Hemisphere options

North of 23° N require the following mitigation options

(1 for small (<24 m) vessels, 2 for large vessel):

Column A	Column B
Side-setting with a bird curtain and weighted branch lines[1]	Tori line[2]
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[1] This option counts as two mitigation measures.

[2] If a tori line is selected from both Column A and Column B, this equates to simultaneously using two (i.e. paired) tori lines.

Management of offal discharge

New Zealand data summary of offal discharge (always alongside primary mitigation measures) highlights:

Rexer-Huber & Parker 2019

Discharge management	Sets % (N)	Trips % (N)	Seabird captures/set (N)
No discharge	1 (7)	3 (1)	0 (0)
Discharge in batches haul offside	13 (62)	10 (4)	0.08 (5)
Discharge in batches haul haulside	**9 (46)**	**10 (4)**	0.20 (9)
Continuous discharge haul offside	5 (23)	5 (2)	0 (0)
Continuous discharge haul haulside	**50 (242)**	**50 (20)**	0.35 (85)
Discharge during set and haul	**0 (0)**	**0 (0)**	0 (0)
Unknown	22 (109)	23 (9)	0.29 (32)
Total	100 (489)	100 (40)	0.27 (131)

- Bycatch increases when discharging on haulside, particularly when discharging continuously (but fishers note offside discharging is not always possible)
- Southern Hemisphere would benefit from management of offal discharge

Management of offal discharge

- No current scientific evidence supports offal discharge as an effective primary mitigation method during setting (McNamara et al. 1999, Cherel et al. 1999, WCPFC-SC19-EB-IP-21).
- Strategic offal management can increase bycatch as birds get conditioned to attend vessels, particularly when sets are prolonged.
- However, offal discharge management is one of the few options to reduce seabird bycatch during hauling
- Yet, retaining offal during hauls may not always be practicable or possible (McNamara et al. 1999, Rexer-Huber & Parker 2019)
- Regardless, offal discharge management is still highly relevant as a common-sense operational practice.

Consequently:

1. Is there any evidence that offal discard management is relevant to only the Northern Hemisphere?
2. Is there any scientific evidence to suggests that holding offal during setting shouldn't be considered a common-sense operational practice.
3. Is there any scientific evidence indicating that holding offal, or discarding offal in batches on the offside during hauling, shouldn't be considered a common-sense operational practice?

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