Tandem-set hoop nets for channel catfish sampling

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A brief history

First described by Missouri ('99) and Iowa ('02) DNRs
A brief history

Gear evaluation:

• **Influence of sampling season**
  (Flammang & Schultz 2007)

• **Hoop net size and mesh size**
  (Sullivan & Gale 1999; Flammang & Schultz 2007)

• **Length of bridles connecting nets**
  (Michaletz & Sullivan 2002)

• **Duration of set**
  (Neely & Dumont 2011)

• **Configuration of throat**
  (Porath et al. 2011)

• **Bait type**
  (Flammang & Schultz 2007)
A brief history

Success stories:

• Michaletz & Sullivan (2002):
  • Mean CPUE: ~ 90 CCF/net series, up to 370/series

• Flammang & Schultz (2007):
  • Mean CPUE: ~ 100 CCF/net series

• Michaletz (2009):
  • CPUE: up to 469 CCF/net series
  • Mean total catch: 436 CCF/lake (range: 0 to 2,757)
A brief history

Not so successful stories:

• Holley et al. (2009):
  • Discontinued use of hoop nets after 2 unsuccessful seasons

• Chizinski (2012):
  • Mean CPUE: ~ 17 CCF/net series
Size selectivity

- < 250 mm are not sampled in proportion
- Upper limits unknown
  - Buckmeier & Schlechte (2009) gear comparison sampled up to 556 mm (no gear sampled larger)
  - Michaletz and Sullivan (2002) up to 860 mm, known to capture in proportion up to 529 mm
  - Chizinski (2012) up to 845 mm
Size selectivity
Hoop nets in my experience

- Often low, variable catch rates
  - In repeated surveys (Jun, Jul, Aug) CPUE ranged from 1 – 103 CCF/series
- Regular occurrence of empty nets
- Size structure varied within summer season
  - In monthly surveys (Jun, Jul, Aug) size structure varied in two of three water bodies
Construction

Primary Components:

- 3 nets
- 2 weights
- Anchor
Construction

Specs:

- 11 ft. long
- #15 twine
- 1 in mesh
- 7 fiberglass hoops
- 2.5 ft diameter, largest hoop
- 2 fingered, crowfoot throats on 2\textsuperscript{nd} & 4\textsuperscript{th} hoop
- 2\textsuperscript{nd} throat is restricted with zip ties
Net modifications:
- Bridle attached to front of net
  - 2" diameter steel ring
  - ¼ in braided nylon rope
- Swivel snap attached to cod end
- Twine to secure the cod end
- 2\textsuperscript{nd} throat restricted
Construction

2nd throat constriction
Construction

2nd throat constriction
Construction

Additional hardware:

• 15 lb. anchor for rear net
• 2 10 lb. weights
  • concrete weights
  • window sash style weights
• Twine to secure the cod end
Recommendations vary:

• Waste cheese
  • stinks
• Soybean cake or pellet
  • cheap
  • IA uses with success
  • NE used with less success
  • KS variable success
• Soy/cheese logs
  • expensive
Net deployment

Necessary equipment:

• Nylon bait bags
• Styrofoam squares to secure bait bags
• 50 ft. rope
  • threads through ring of 1st bridle
  • used to stretch nets taut
• GPS unit to mark location
  • visible markers (e.g., buoys) encourage tampering
  • flagging tape is helpful to mark location from shore
• DO meter
Net deployment

- Attach nets and weights prior to setting
  - thread set rope through ring on front bridle
- Set parallel to shore along constant profile
- Set from bow as operator backs up boat
  - boat operator should mark GPS coordinates as soon as anchor is in the water
- Pull nets taut with set rope (fully stretched set ~45 ft.)
  - avoid dragging the nets
Site selection

- > 3 ft. of water
- Above thermocline
- Avoid steep slopes to prevent nets from rolling
  - concrete weights help stabilize
- Avoid heavy vegetation or structure
  - can make net retrieval very difficult
Sampling protocol

Recommendations vary, generally:

Season:
• Spring and Summer (Missouri)
• Summer and Fall (Iowa)

Duration:
• 72 hr sets
  • Neely & Dumont (2011) found that catch was similar in 48 hr and 72 hr sets
Sampling effort

Recommendations vary, generally:

- < 50 acres, 4 series
- ≥ 50 and < 150 acres, 6 series
- ≥ 150 acres, 8 series minimum
Appropriate waters

• Small impoundments
  • best documented success in these systems

• Large reservoirs
  • maybe with increased sampling effort

• Gravel pits
  • can be effective if slope is not extremely steep
Net retrieval

Necessary equipment:

• 50 ft. rope with grappling hook
• GPS unit to find marked location
• Sonar depth finder to locate nets
  • a good depth finder is key to retrieval if nets are not marked with a visible marker
• Clip to attach nets to side of boat
Net retrieval

• Back up boat perpendicular to shore while dragging from the bow with a grappling hook

• Nets will be visible on a good depth finder

• Once nets are located, find the front of the series, remove the 1st net and clip remaining nets to the side of the boat
Hoop nets: advantages

- Fast, simple deployment
- Minimal personnel effort
- Fish are easy to remove
- Require little handling
- Low fish mortality
- Often high catch rates
- Effective at capturing centrarchids
Hoop nets: drawbacks

- They take up a lot of space
- Can be difficult to retrieve
  - windy conditions
  - heavy vegetation
  - poor GPS coordinates
- Rely heavily on electronics for net retrieval
- High turtle mortality
- Catch rates can be variable
- Effective at capturing centrarchids
Final thoughts

There is room for additional gear evaluation of this sampling method.

- sampling season
- duration of set
- bait type
- orientation of net mouth

I recommend running some trials to determine what works best in your systems.


