aquaculture performance

DONAGHYS
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THERE'S NO SUBSTITUTE FOR EXPERTISE, EXPERIENCE AND QUALITY

Quality, reliable, cost effective solutions for mussel farmers.

Donaghys is a New Zealand manufacturer that's taking on the world, and succeeding in the marine and aquaculture markets. Few New Zealand companies have traded continuously for well over 130 years. Owned and operated by kiwis, the team at Donaghys are rightfully proud of their achievements.

Since the inception of the long line system in the New Zealand aquaculture industry in the 1970's, Donaghys have been leading the way in mussel rope development, manufacturing and testing. Considerable innovation and refinement has taken place in the development in the rope and the way it is used.

reliability

With the dynamic growth of the mussel industry, coupled with innovative growing and harvesting techniques, state of the art processing procedures have evolved. Donaghys have ensured their mussel rope development is supplying international mussel farmers with technologically advanced products to meet the increasing demands of modern systems.

Donaghys actively work to constantly develop and improve ways to catch and farm mussels. Our research and development team have an open mind policy to evaluate any ideas for improvement received by our own international team and directly from industry clients.

Donaghys ropes have additional UV stabiliser added to protect the rope from degradation. Our range of high strength, high abrasion resistant ropes have been developed to meet the rigors of the marine industry. These innovative products deliver to the industry a reliability you can trust.

MORE MUSSELS PER METRE

When broken down into dollars per year per metre, the Donaghys rope is far more cost effective than any other system. Couple this with the yield output (cost per kg) annualised over 8 to 10 years and you're on to a winner.

This means that over its lifetime the Donaghys rope works out to be 25% cheaper than other methods of spat collection.

As well as initial cost savings on the ropes, the continuous farming system around which Donaghys ropes are designed will give additional cost savings on seeding, catching and harvesting.

Donaghys rope - in conjunction with the continuous long line system - will cut farming costs significantly over any other system used today.

"With Donaghys Spat ropes we are ensured of a higher more stable yield when compared to other spat ropes we have used."

JACCO VAN STEE,
SKIPPER OF THE YE 79 ANNA TRIJNTJE

TESTS VERIFY ENHANCED YIELD

Up to 25% more yield per metre for a comparable purchase price

Because Donaghys Xmas Tree ropes deliver significantly more surface area per metre of rope, yield is dramatically enhanced through higher settlement rates.

In fact, independent research was conducted in South Australia and it was found that Donaghys standard Xmas Tree rope had the highest mean settlement for any rope type group with a score of 528 spat/metre, substantially above all other competing brands on the market.

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spat ropes

WEIGHTED XMAS TREE

RANGE

- 14mm core with 60-65mm cut trim
- 3 strand, 5 strand and 6 strand lead options
- Coil and bag options
- Black colour

FEATURES

- Superior spat catching
- Proven spat retention
- Unique trim construction
- Straight trim reduces damage to spat during stripping
- Each individual strand weighted
- Fully balanced construction
- UV stabilised to protect rope from degrading
- Will not rot

ECO WEIGHTED XMAS TREE

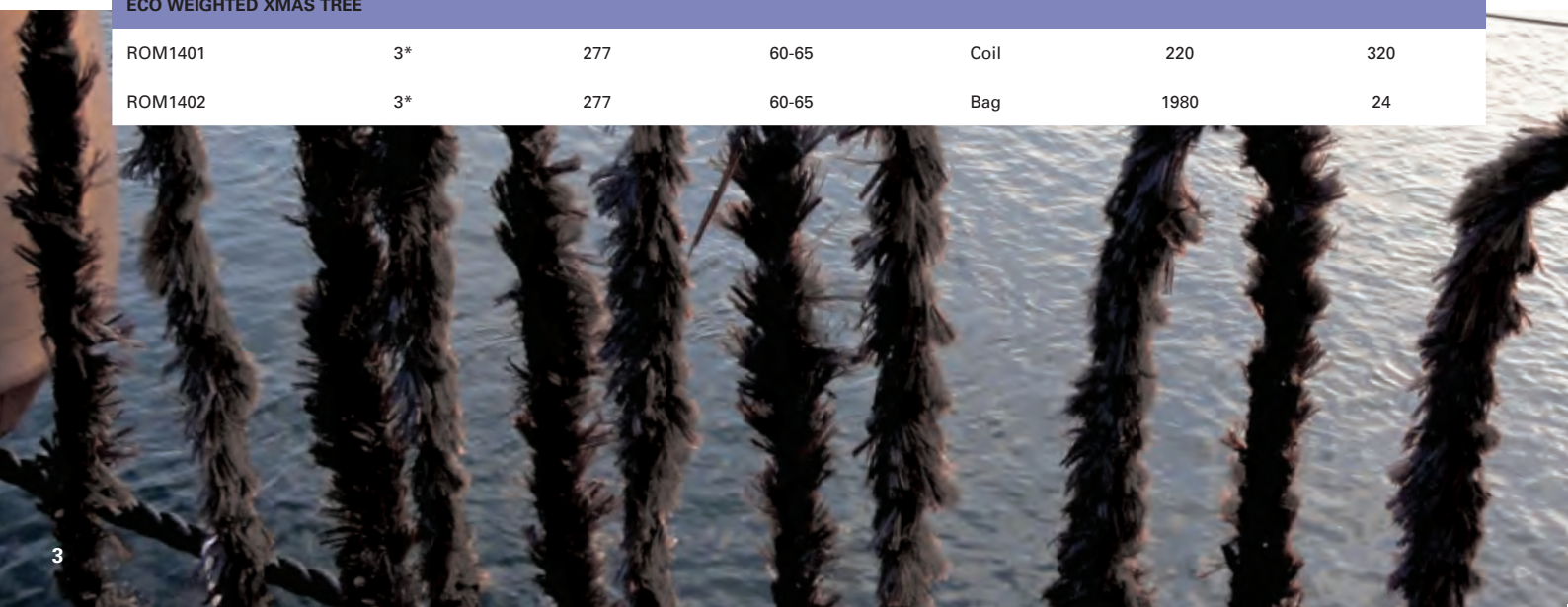
- 14mm core with 60-65mm cut trim
- Coil and bag options
- 3 strand construction
- Black colour

- 16% heavier than lead
- Economical and environmentally friendly
- Patented weighted polymer
- Increased catch/holding surface
- Proven catching performance

TECHNICAL TABLE

**Weighted polymer*
***Measured Trim size*

Code	No. strands lead	Grams/Metre	Size (mm)**	Unit	Length (m)	Units per 20ft container
EXTRA WEIGHTED XMAS TREE						
ROM1406	3	236	60-65	Coil	220	320
ROM1405	3	236	60-65	Bag	1980	24
5 STRAND WEIGHTED XMAS TREE						
ROM1420	5	318	60-65	Coil	220	320
DOUBLE WEIGHTED XMAS TREE						
ROM1412	6	364	60-65	Coil	220	320
ECO WEIGHTED XMAS TREE						
ROM1401	3*	277	60-65	Coil	220	320
ROM1402	3*	277	60-65	Bag	1980	24



BRAIDED CROP & SPAT ROPE

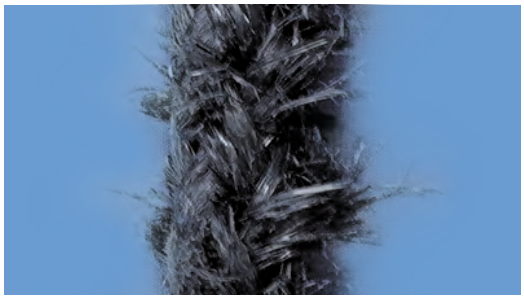
RANGE

- Braided core
- Weighted options for spat collection
- 1000m and 1200m bags
- Black colour

FEATURES

- No twisting
- Anti-Torque
- High yield
- Cut trim construction
- Superior spat retention

HATCHERY BRAID



- 12mm core
- 200m reel
- Black colour

- Braided 8 strand polypropylene rope
- Abraded surface attachment points
- Excellent spat collection and retention
- Easily transportable from hatchery
- Easily stripped with minimal spat damage
- Internally weighted core
- Proven in world leading hatcheries

TECHNICAL TABLE

Code	Grams/Metre	Core Size (mm)	Unit	Length (m)	Units per 20ft container
BRAIDED MUSSEL CROP ROPE					
ROM1221	113	18	Bag	1200	24
ECO WEIGHTED MUSSEL BRAID					
ROM1240	270	20	Bag	1000	24
HATCHERY BRAID					
ROM1201	150	12	Reel	200	320

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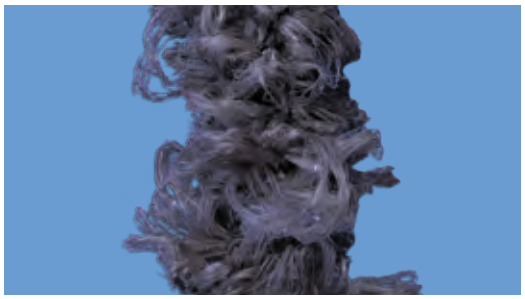
crop ropes

RUSSET LOOP



RANGE

- 18mm core
- 75mm loop trim
- 1500m bag

FEATURES

- Twin brown high density trims
- Unique twin trim support process giving short dense loops combined with longer outer loops
- Exaggerated core diameter to increase bulk
- Highest surface area available
- Unique 'Fibtrim' technology allows multiple attachment points

OPEN WATER

- 14mm core
- 50-60mm double density loop trim
- 320m coil and 1600m bags

- Designed for open water farming
- 18 month development and field trials
- Special Aqua trim reduces Bio fouling
- 'Fibtrim' allows multiple attachment points
- Double loop trim construction
- Highest loop density available
- Fully balanced construction
- UV stabilised to protect rope from degrading
- Reduces slumping caused by over settlement

AQUALOOP

- 14mm core
- 55-65mm loop trim
- 400m coil in Aqua colour
- 2000m bags in Aqua or Brown (Brownloop)

- Cost effective brother to Open Water
- Ideal for high tidal areas
- Special trim reduces Bio fouling
- 'Fibtrim' allows multiple attachment points
- Fully balanced construction
- UV stabilised to protect rope from degrading

SUPER XMAS TREE

RANGE

- 14mm core
- 55-65mm cut trim
- 500m coil

FEATURES

- Ideal for sheltered waters
- Straight trim reduces crop damage during harvest
- Economical construction
- High quality UV stabilised yarn
- Fully balanced construction
- Proven in European markets
- Ideal for fish ladders

LITE LOOP

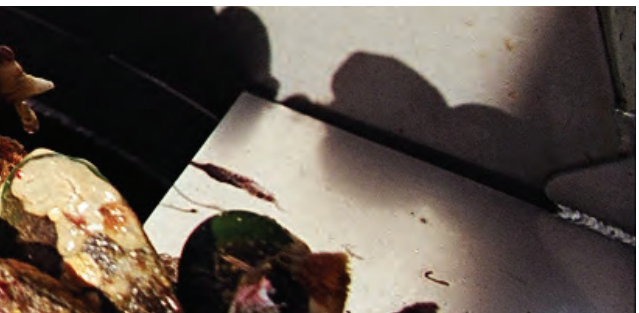
- 10mm core
- 50mm loop trim
- 500m coil

- Designed for high current/tidal areas
- Lightweight core
- Dense loop trim configuration
- Produces significantly less drag than standard ropes
- Reduces fouling on ropes
- Reduces slumping caused by over settlement
- Unique 'Fibtrim' technology

TECHNICAL TABLE

**Measured Trim size*
***Double density loop trim*

Code	Grams/Metre	Colour	Size (mm)*	Unit	Length (m)	Units per 20ft container
RUSSET LOOP						
ROM1416	205	Brown	75	Bag	1500	24
OPEN WATER						
ROM1410	147	Aqua	50-60**	Coil	320	160
ROM1411	147	Aqua	50-60**	Bag	1600	24
AQUALOOP						
ROM1407	118	Aqua	55-65	Coil	400	160
ROM1413	118	Aqua	55-65	Bag	2000	24
ROM1409 (Brownloop)	118	Brown	55-65	Bag	2000	24
SUPER XMAS TREE						
ROM1403	102	Black	55-65	Coil	500	160
LITE LOOP						
ROM1000	92	Aqua	50	Coil	500	224



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AQUASTEEL ROPE

RANGE

- Backbone and Anchor Rope
- 20mm in 250m coil
- 24mm - 40mm in 220m coil
- Black with Aqua marker
- Custom lengths available - Made to order

FEATURES

- Proven Backbone rope in mussel farming for over 20 years
- Designed in conjunction with mussel farmers
- Stronger than standard PP ropes by up to 20%
- High abrasion resistance
- New construction to improve abrasion and durability

LASHINGS & SNOODS

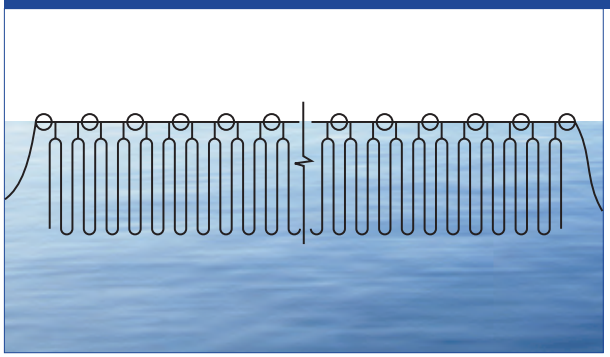
- 5mm Black in 500m spool
- 6mm Blue/Yellow Snoods in 3 x 100 per carton
- 6mm Black Magic Snoods in 4 x 100 per carton
- 7mm Heavy Black in 500m coil

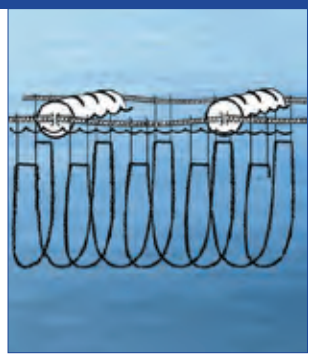
- Designed to be used in conjunction with the high strength systems of today
- Made from polypropylene to reduce wear on backbones
- UV stabilised to provide resistance from degradation and the elements
- Soft and strong
- Easy to knot
- Pre tied snoods save the farmer in time and cost

FARM STRUCTURE SYSTEMS

One spat collection (nursery) line is generally required for four growing lines. The nursery lines are used to hold spat and to ongrow newly seeded rope until crop on the growing lines finish their 15 to 24 month growth cycle.

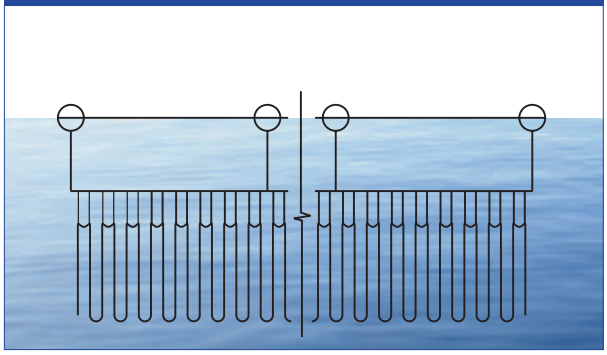
CONTINUOUS ROPE SYSTEM





A series of buoys attached together by Aquasteel rope, from which mussel lashing suspends a continuous line of Donaghys culture ropes.

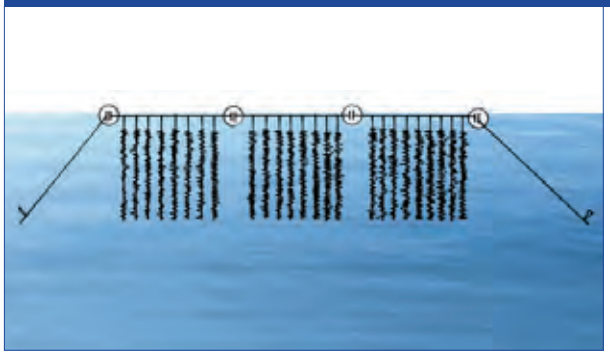
SUBSURFACE SYSTEM



The subsurface system is used to drop the continuous system below rough water or to target specific water depths for spat catching. Predominantly used in open water farming.

- Maximises water use
- Minimises harvesting time
- Most efficient system available

OLD SINGLE DROP LINE SYSTEM



Single droppers attached to either a single backbone or raft allowing manual harvesting.

- Low production
- Manual harvest method
- Labour intensive

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technical

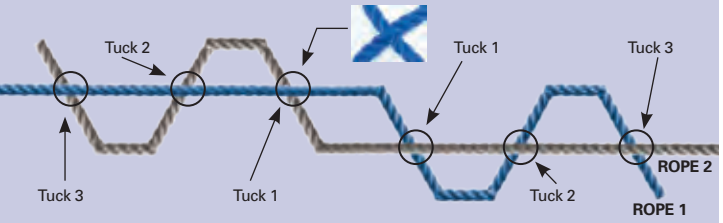
"It was noticeable in cumulative spat analysis that the performance of the (Competitor Named) product appeared to reach a Spacial Settlement Limitation or Capacity prior to the Donaghys product for all results.
Donaghys Xmas Tree rope's higher performance factor was even more evident on ropes with previous use and abrasive wear."

INDEPENDENT RESEARCH, SOUTH AUSTRALIA

MUSSEL ROPE SPLICING

INSTRUCTIONS

1. Tape both ends of the rope to be spliced to prevent fraying.
2. Make a hole by separating the lay of the rope, approximately 30cm from the end of one of the ropes and put the other rope through the hole.
3. Pull the rope which is through the hole to the same length as the other rope.
4. Make a hole in one of the ropes about 6cm from where the ropes join.
5. Tuck the other rope through the hole.
6. Continue steps four and five until each rope is tucked into the other rope three times making six tucks in total.



OPEN WATER / AQUALOOP BREAKLOAD TEST

"Suggested splicing method retains approx. 98% of original breaking strain"

Non Spliced Rope - Average Breakload of 1736kg (over 3 tests)

Spliced Rope - Average Breakload of 1720kg

Test No. DN03/13, Dunedin Laboratory

TIMING AND DENSITY RECOMMENDATIONS TO MAXIMISE YIELD

SPAT COLLECTION

Optimal seed catching (spat collection) occurs when water temperatures fall from summer highs. At around 17-18°C competing organisms are minimised and present less threat of fouling.

HATCHERY TRANSFERS

Low spat density and poor survival rate appear to be correlated to transplanting in times of high marine growth (where natural fouling occurs). It is recommended that hatchery transfers take place during lower settlement periods i.e. late autumn through winter, to allow establishment, migration and growth of spat before competition occurs with naturally occurring marine settling organisms.

SEEDING DENSITY

Seeding density is critical. Excessive densities may impede growth, hence efficiencies are dramatically enhanced with a culture rope of substantial surface area. Seeding rates are a localised science and are influenced by required harvest timing, sizing and local phyloplankton feed levels in the waters along with tidal flow. Seeding rate variances range from calm low tidal movement regions of 200 to 325 spat per metre to open water 7kg+ harvest rates in open water conditions of 350 spat per metre.

EXTRA SURFACE AREA PER METRE DRAMATICALLY ENHANCES YIELD

Mussels are best seeded at a small size, less than 20mm long as mortality from Bysuss withdrawal is minimised, growth rate is increased as the mussels spread out. According to independent research conducted in South Australia, "Heavy mussel spat settlement definitely reduces the ability to settle other marine organisms as their larvae are either consumed or unable to secure settlement space on the mussel ropes."

In Port Lincoln, South Australia, least competition is during winter from May to September. By contrast, maximum settlement in New Zealand is generally achieved on Donaghys spat rope mid winter when larval and fouling levels are low. Densities of up to 3000 spat per metre are achieved and although summer fouling becomes evident September to December, mussel spat survival remains high right through to transfer time in mid to late February.

COMMON HANDLING PRACTICES

HANGING PREPARATIONS FOR MUSSEL GROW OUT ROPES IN THE LONG LINE PROCESS

Coils should be uncoiled in an anti-clockwise direction from the centre of the coil preferably into a bulk bag or container to ensure no twist is held in the rope. The rope should be placed as far away from the bulk container as possible when pulling out to allow the rope to settle prior to storage. Coils can be joined via a simple recommended splice method to form a continuous length.

If the mussels are small or light, make sure that the rope is soaked well with water prior to use.
This step is important to reduce buoyancy and allow rapid sinking of the seeded rope. Once the rope has been thoroughly drenched, the seeding and socking process is completed in preparation to suspension from backline.

Where a small shell harvest in less than 12 months cultivation is targeted, seeding rates of 450-550 per metre of 20-25mm are common. It should be noted that over seeding can lead to poor settlement rates and spat loss. Seeding rates directly relate to surface area available, yield expectation and feed rates applicable to region.

Fully seeded, socked grow ropes are then attached in continuous format on the anchored backbone (commonly 110m in length). The seeded ropes are attached to the single or double backbone system in 400 to 600m spacings depending on seeding rates and on feed levels in the region.

Attachment of the seeded rope is by looped lashing of soft construction. This soft construction is easy on hands, gives maximum surface coverage on the backbone surface to minimise slippage, and least abrasion resistance to the backbone which is to be preserved for long lasting use.

The loop depths of seeded grow out rope must account for around 2m clearance and minimal tide conditions to avoid loss of crop growth and or gear damage.

ONGOING MAINTENANCE OF ROPES

As the continuous long line system requires the ropes to pass through several handling processes, it is important from a farm management perspective to inspect the ropes regularly. Twist can be imparted into the ropes over time; a simple inspection can check this and remove any twists as they appear. As the ropes are manufactured with a neutral bias any twist can be removed.

Place the rope in a bulk container on a platform which can be revolved. Pull rope up into the air for at least five metres or as high as possible, then over a wheel then back down into another suitable storage container. As the rope rises into the air, any twists will be evident and show up as a pig tail or knot. Revolve the base platform allowing the twist to turn out of the rope.
If needed the rope can be reconditioned during this process by passing through revolving brushes just prior to placement in the storage bag.

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