Future Beef Programme

Beef Grass Walk:

How to save more money on your farm this spring!

John Barry's Farm| 1st March 2023

Mill Road, Newtown, Nenagh, Co. Tipperary

Teagasc Future Beef Programme

The aim of Future Beef is to demonstrate to beef farmers how they can produce a quality product as efficiently as possible to make beef farming more profitable while also making it more environmentally and socially sustainable. Future Beef farmers are also participants in the Signpost Programme.

The whole programme hinges on our network of 22 demonstration farms. All our farmers have a very positive attitude towards suckler farming. They are willing to take on new technologies and develop efficiencies to improve profitability and reduce the negative effects of agriculture on the environment around them.

Key objectives:

- Create more sustainable and profitable farms
- Reduce greenhouse gas (GHG) & ammonia emissions
- Improve water quality
- Improve biodiversity

We will achieve this by focussing on reducing inputs and the costs of production while increasing the performance of every animal on the farm.

Acknowledgement

We wish to thank the farmers that have agreed to take part in the programme, particularly to John for hosting this farm walk. We look forward to working with them and their local advisors over the coming years. We are confident that all parties involved in the programme will benefit hugely from the experience. We wish to acknowledge all the sponsors of the Future Beef Programme and thank them for their commitment to the programme.

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Following a Spring Rotation Plan

Every extra day at grass is worth >€2.50/LU/day!!

- Walk your farm.
- Let out stock as soon as ground conditions allow.
- What are your priority stock?
  - Bulling heifers
  - Calved cows
  - Cattle to be finished this year
- Do not graze silage ground first, graze 1/3 of grazing ground first.
- Graze medium covers first to train cattle back into grazing.
- Graze tight.
- Then graze heavier covers.

Turnout - 17th March	17th March – 1st April	1st April to "magic day"
Grazing ground	**Silage ground**	**Grazing ground**

What if you are behind your targets?

- Let out more stock
- Graze more of the lighter covers until you catch up

What if you are ahead of your targets?

- Graze heaviest covers
- Re-house some stock
- Supplement with hay/silage or meal
- Can you graze silage ground for a second time?

Spring Rotation Planner – Dry Farm

Farm area _____ ha 30% by 1st March _____ ha 60% by Patricks Day _____ ha 100% by 5th April _____ha	Targets: ➢ 30% by 1st March ➢ 60% by Patricks day ➢ 100% by 11th April

Week	Area Grazed - Dry Farm
Feb 8 – 14th	
Feb 15 – 21st	
Feb 22nd – 28th 30%	
March 1st – 7th	
March 8th – 14th 60%	
March 15th – 21st	
March 22nd – 28th	
March 29th - 4th April	
April 5th – 11th	**Begin the second rotation**

Spring Rotation Planner – Heavy Farm

Farm area _____ ha 30% by 14th March _____ ha 60% by 27th March _____ ha 100% by 15th April _____ha	Targets: ➢ 30% by Patricks day ➢ 60% by 1st April ➢ 100% by late April

Week	Area Grazed – Heavy Farm
Feb 15 – 21st	
Feb 22nd – 28th	
March 1st – 7th	
March 8th – 14th 30%	
March 15th – 21st	
March 22nd – 28th 60%	
March 29th - 4th April	
April 5th – 11th	
April 12th - 18th	
April 19th – 25th	**Begin the second rotation**

How to Save Money on Fertiliser

1. **Take soil samples to establish the soil fertility**
   - Take 1 sample per 5ha.
   - The soil sample will be valid for 4 years.

2. **Correct your soil pH by spreading lime**
   - Spread lime based on soil sample results.
   - Target pH is >6.2 for mineral soils and 5.5 for peat soils.
   - Spread on grass covers <800 kg DM/ha.
   - Do not spread more than 3t/acre in a 2 year period.
   - Avoid cutting silage for 3-6 months on paddocks that have been limed.
   - To minimise N losses from slurry (up to 50%) and urea, apply cattle slurry first and then apply the lime 7 to 10 days later.
   - For high Molybdenum soils, target a soil pH of 6.1-6.2 to avoid any issues with copper lock up.
   - At least 35% of ground limestone (350 kg/tonne) has a particle size < 0.15mm. This component of the lime is fast acting and very reactive and will start working immediately (0-6 months). The remaining 65% lime (650 kg/tonne) will be broken down in the soil in the medium term (6-24 months) and helps to maintain soil pH levels in the longer term until the soils are re-sampled in year 4-5.
   - Research shows that liming acidic soils increases grass production by 1.0t DM/ha. On a drystock farm this is valued at €105/tonne DM.
   - An application of 5t/ha of ground limestone to correct soil pH represents a cost of €25/ha/year over 5 years. The return on investment from lime gives **€4-€7** worth extra grass for every €1 invested in lime.

3. **Develop a nutrient management plan with your advisor**
   - This will give you field by field recommendations for spreading slurry, FYM and chemical fertiliser based on the crop demands.
   - It will also allow you to stay within your fertiliser limits and avoid any financial penalties.
   - The nutrient offtakes for a 5t DM/ha silage crop are outlined below:

Cut	1st	2nd
N - P - K advice (5 t DM/ha)		
kg/ha	100 – 20 – 125	80 – 12 – 75
Units/acre	80 – 16 – 100	64 – 10 – 60

   - To build soil fertility from index 1 and 2 the following nutrients are required:

	Phosphorus (P) (Units/acre)	Potassium (K) (Units/acre)
Index 1	16	48
Index 2	8	24

- Correcting your soil fertility can grow an additional 25% more grass without using any extra chemical nitrogen.

4. Test your slurry

- Taking a slurry sample will provide information about its nitrogen, phosphorus and potassium content so that you can balance chemical fertiliser applications accordingly.
- It can be sampled by sending it to a laboratory for analysis (approximate cost of €80/sample) or using a hydrometer which gives a result based on the dry matter of the slurry.
- The following table gives the nutrient content results based on the reading.

Table: Slurry Hydrometer Conversion Table for available N, P and K content

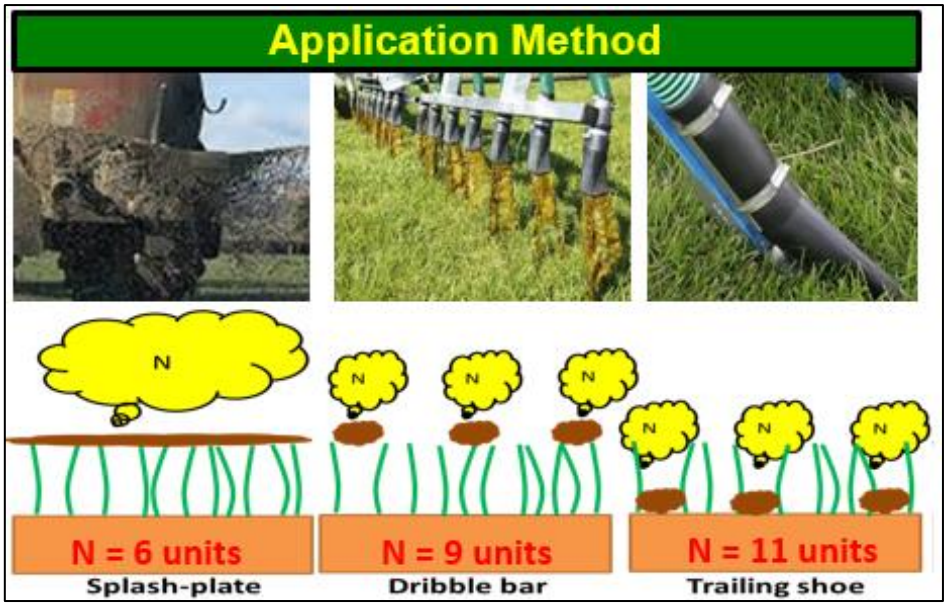
		kg/m³			*kg/1000 gals*			*units/1000 gals*		
Slurry	**Dry Matter %**	**N**	**P**	**K**	**N**	**P**	**K**	**N**	**P**	**K**
Cattle	**1**	0.2	0.1	1.0	0.9	0.6	4.5	2	1	9
	2	0.4	0.2	1.4	1.6	1.0	6.4	3	2	13
	3	0.5	0.3	1.9	2.4	1.3	8.6	5	3	17
	4	0.6	0.4	2.3	2.9	1.7	10.4	6	3	21
	5	0.8	0.5	2.7	3.6	2.0	12.3	7	4	25
	6	1.0	0.5	3.2	4.4	2.4	14.5	9	5	29
	7	1.1	0.6	3.6	4.9	2.8	16.3	10	6	33
	8	1.2	0.7	4.0	5.6	3.1	18.2	11	6	36
	9	1.4	0.8	4.4	6.2	3.5	20.0	12	7	40
	10	1.5	0.8	4.9	6.9	3.8	22.2	14	8	45
Pig	**2**	1.5	0.4	1.7	6.8	2	7.5	14	4	15
	4	2.0	0.9	2.1	9.1	4	9.4	18	8	19
	6	2.5	1.3	2.5	11.4	5.9	11.3	23	12	23

Figures are calculated on 40% of N from cattle slurry and 50% available N from pig slurry. P and K is calculated at 100% availability However, for slurry applied to Index 1 and 2 soils the availability of P is at 50%, therefore the value of P is taken as half the value reported.

Cattle slurry nutrient values are based on reposted figures by a Teagasc study (Berry,2013). Pig Slurry values are based on UK figures (DEFRA, 2010).

5. **Spread manures where you will get the best response**
   - In spring growth rates are low and the nitrogen use efficiency is very low (30-35% v's 80-85% in April).
   - Spread 20 units of nitrogen in February at the:
     - Right rate – max 20 units per acre.
     - Right time – soil temp >6°C and rising, ground conditions are good, at least 48hrs dry weather forecast.
     - Right place – good soil fertility, pH, P & K levels, reseeds, dry south facing ground.
     - Right product – protected urea.
   - Cattle slurry is worth €50 per 1,000 gallons this spring and pig slurry is worth €58 per 1,000 gallons. Save this until after mid-March when grass has a requirement for P and K to get the best response from it.
   - From mid-March onwards, spread slurry & FYM on silage fields which have a higher nutrient demand first and then on to low P & K index fields to help build soil fertility.
   - Approximately 50 units per acre should be applied to grazing ground by 1st April.

6. **Use Low Emissions Slurry Spreading (LESS) Equipment**
   - Using a dribble bar in spring will retain an extra 3 units of nitrogen per 1,000 gallons of slurry versus using a dribble bar which is worth €3.27.
   - Furthermore, spreading slurry with a dribble bar will save an extra 5 units of nitrogen per 1,000 gallons of slurry which is worth €5.45.
   - Other benefits of using LESS include:
     - Slurry can be spread on heavy covers;
     - You can target fields with lower P and K indexes;
     - Cattle will graze three weeks later; and,
     - Reduced odour – can apply to fields closer to neighbours.



7. **Use protected urea as your main chemical nitrogen source**
   - Protected urea is 30% cheaper than CAN this spring.
   - It has 78% lower ammonia emissions than standard urea.
   - It has 71% lower nitrous oxide emissions than CAN.
   - While it is more expensive than standard urea (on a per tonne basis), it will give the same "effective N" for the plant as standard urea, at a 12.0% lower spreading rate as there are less losses.

N Type	Urea 46%	Protected Urea	Can (27% N)	
€/Kg N* (€/unit N*)		€2.07 (€1.03)	€2.18 (€1.09)	€3.15 (€1.58)
Urea €950/t, Protected Urea € 1,000/ t, CAN €850/t (Jan 2023)				


5 tonne
CAN
€4,250
=
3 tonne
Protected
UREA
€3,000
Save €1,250!

Calibrating Your Fertiliser Spreader

F. Quigley & M. Plunkett

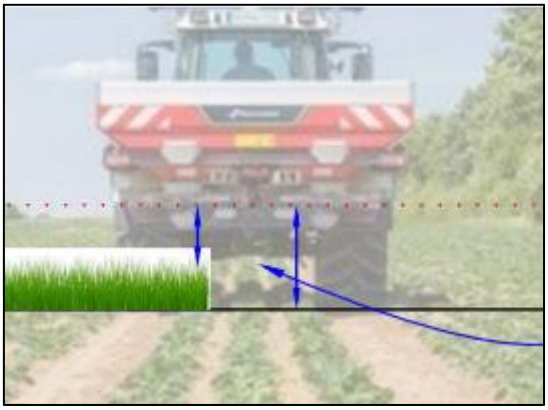
Fertiliser Spreader – Basic Setup & Calibration

1. Check the spreader before use

- No damage on hopper or frame.
- Disc rotating freely, no play in bearing or gearbox.
- Regulator mechanism functions, no wear in linkages.
- Vanes not damaged or worn.
- Agitator functions.
- Headland control functions, fins not bent.
- Lights are working.
- PTO cover & chains in place.

2. Fit the machine correctly

- Check operators manual, ensure tractor and spreader are compatible.
- Fit front weights as necessary.
- Check tractor controls.
- Ensure machine is level when viewed from rear. If not spread pattern will be wrong.
- Check the tyre pressure and adjust lower link arms. Machine height is measured over the crop.
- Set the height of the spreader according to instruction manual, for example 75cm+ over the crop.



3. Machine settings

- Set the machine for bout width, fertiliser and rate you intend to use.
- Use the Smart phone app, website or calibration/setting book to determine (depending on model).
    - ➢ Disc / vane choice and vane setting
    - ➢ Fertiliser drop point setting

- Height of machine
- Front/back angle of machine
- Regulator setting

- Some apps will also give you the flow rate, Kg/min of fertiliser.
- Flow rate (Kg/min) =

$$\frac{\text{Application rate (kg/ha) x Forward speed (km/hr) x Working width (m)}}{600}$$

4. Calibrate the machine

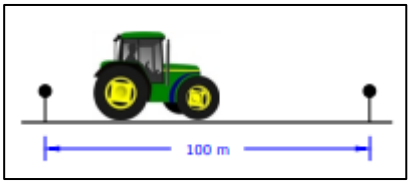
- Depending on machine type:
- Example
  - Remove a disc.
  - Turn on machine (agitator needs to be operating).
  - Open shutter for 30 seconds.
  - Collect fertiliser in a bucket.
  - Weigh fertiliser collected.
  - Amount collected (kg) x 4 = flow rate (kg/min).
  - If the actual flow rate from the machine does not match the desired flow rate adjust the regulator and recalibrate.

5. Calibration video

- We have created a series of short videos to accompany the information sheets. These go through the process of calibrating your fertiliser spreader, setting your fertiliser spreader and fertiliser quality.
- See https://youtu.be/dFZQK3BjsQs

6. Forward speed & PTO speed

- Calibrate the tractors forward speed;
  - Mark out 100m.
  - Select desired forward gear.
  - Set engine revs to give PTO speed of 540rpm.
  - Use a rolling start.
  - Record time taken to cover 100m.



- Forward speed (kph) =

$$\frac{360}{\text{Time taken in seconds}}$$

Fertiliser Spreader – Tray Test & Field Procedure

1. **Check settings in field**

- Machine set to manufacturer's guidelines for the fertiliser being used.
- Height of machine is correct.
- PTO& forward speed.
- Working width is correct.

2. **Tray test**

- Check for even distribution;
  - ➢ Set trays at equal distance across full bout width.
  - ➢ Run spreader over the trays in three passes; far left, centre, far right tramline, to ensure full spread pattern is recorded.
  - ➢ Collect fertiliser in measuring cylinders and compare.

3. **Marking out/GPS**

- To achieve an accurate distribution it is critical that working width is correct;
  - ➢ Physically mark out bouts widths in field.
  - ➢ Foam marking possible for narrow working widths.
  - ➢ Alternatively use of GPS guidance will ensure bout width is maintained.

4. **Headland control**

- Many different options available: reverse disc direction; different disc/vane; deflector etc.
- Many offer the user select the extent of control;
  - ➢ Yield orienting - full rate to boundary, with small amount beyond boundary.
  - ➢ Environmental - Reduced rate to boundary with zero beyond.
  - ➢ Watercourse - Reduced rate to boundary side, +1m buffer zone un-spread.

5. **Maintenance/care**

- Fertiliser is corrosive.
- Clean spreader after use.
- Lubricate all moving parts.
- Apply anti corrosive protection.
- Store spreader safely.

- Replace damaged parts.

6. Video

- We have created a short video which goes through the process of setting your fertiliser spreader.
- See https://youtu.be/rfMXCTF10Sc

Fertiliser quality characteristics & impact on spreading

1. Fertiliser granule size

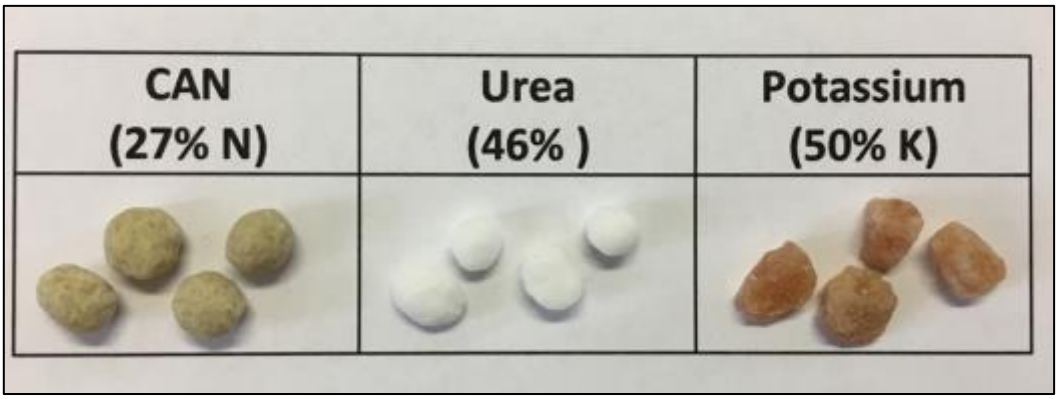
- Particle size and size distribution will have a large impact on the fertiliser spread width and uniformity.
- In general large granules will be thrown further than small granules.
- The more variation within granules the greater risk to uneven spreading/segregation.
- Aim for 80% of granules in the 2 to 4mm range.
- Larger granules better on wider spread width.
- Use a fertiliser sieve box to determine fertiliser size range.

2. Shape of granules

- Fertiliser granule shape will vary among fertilisers.
- Fr example nitrogen (CAN, urea & phosphorus) tend to be round in shape whereas potassium tends to be angular.
- Round granules tend to roll along the vanes while angular granules tend to slide along the vanes.
- Rounded granules move off the spreader more easily and travel through the air better.
- Angular granules, due to their angular nature and movement on spinning discs can result in some breakage on the disc. They don't travel as well in the air due to their granule shape and exit velocity from the vanes.

3. Fertiliser density

- Granule density represents the mass to volume ratio of granules.
- This is a measure of the physical weight of 1 litre of fertiliser measured by a weighting scale.
- Important factor when setting up the fertiliser spreader.
- Large impact on the spread width of the fertiliser.
- More dense particles will spread wider at high spinning disc speeds.
- Blending fertilisers of similar density will be important to prevent segregation.
- Urea is a low density fertiliser – granule density of 0.75kg/L, more difficult to spread on larger bout widths.
- CAN (27%) is a high density fertiliser – granule density of 1kg/L, easier to spread.



4. **Granule hardness**
- This refers to the force that can be applied before the granule breaks.
- Granule hardness will influnece both the spread width and disc speed.
- Soft fertilisers may shatter on the disc resulting in granule breakage.
- Check fertiliser granule hardness with a hardness indicator.
- Aim for a granule hardness of greater than 6.

5. **Video**
- We have created a short video that explains fertiliser characteristics and how to assess them.
- See https://youtu.be/qsK9warJftw

Fertiliser spreader – Technology & development

1. **Auto calibration**
- Higher spec machines will self-calibrate.
- They use a combination of weight cells and speed sensors to constantly check and adjust the spreader output.
- They will automatically adjust the regulator to ensure the correct rate is being delivered onto the disc, even if the tractor speed changes.

2. **GPS section control**
- Gauging the correct 'turn on' and 'turn off' points when leaving or approcahing the headland is challenging with modern spreaders. This can now be automated with GPS giving the exact position and controlling the on/off setting.
- GPS technology can also be used to alter the fertiliser flow rate and the shape of the spread pattern to allow more accurate spreading on short runs. This is achieved by

altering the fertiliser drop point on the disc or the disc speed while adjusting the application rate. Manufacturers refer to this as 'section control'.
- These technologies can prevent lodging/yiled loss on headlands and can also save fertiliser.

3. N sensor
- Tractor mounted reflectance sensors can capture information about variation in the volume of the crop and its N content.
- This can be used to modify the amount of N applied, as the spreader moves through the field, although information about future crop demand and soil supply are also needed. The crop information can also be acquired by a drone or satellite in advance of fertilising the crop.

4. Spread pattern sensor
- Spreader manufacturers are looking at ways to improve the accuracy of the spread pattern for different fertilisers.
- One system uses sensors mounted on the rear of the spreader to check thespread fan as it leaves the spreader and makes adjustments as required.
- This can also be linked to a wind speed sensor mounted on the machine, the spreader will compensate for adverse wind.

5. Simplified tray test
- Tray testing is being made simpler so that it can be done more regularly.
- The use of rubber mats which can be easily stored in the tractor cab and a smart phone means it is easy to set up.
- Once the fertiliser has been applied to the mats a simple photo will calculate the amount of fertiliser on each mat and will compare the results using the spreader app.


Calibrating your slurry tanker

- Scan the QR code on the right to Teagasc online slurry spreading calibration tool.

A to Z of FARM SAFETY

A	**Always** consider SAFETY on the farm.
B	**BULLS:** Beware of aggressive animals on your farm. Be sure to cull cross bulls, cows, rams, stags from your farm.
C	**CHILDREN:** Always supervise children on the farm, especially during machinery operations.
D	**DRAWBARS:** Never let anyone ride on the drawbar of your tractor or any other machinery. Do not allow anyone ride in an open trailer.
E	**ELECTRICITY** can kill. Beware of overhead power lines and buried cables.
F	**FORESTRY and tree felling:** Take care not to be caught under falling trees and logs. Attend a chainsaw and tree felling course.
G	**GAS:** Slurry gases can kill. Remove all stock from slatted sheds before agitating. Never enter a shed when slurry is being agitated. Close agitation point after each use.
H	**HORSES:** Some horses can be dangerous. Always wear safety equipment e.g. helmet when handling or riding horses. Be wary of being kicked by horses.
I	**INSPECT:** Check safety equipment on your farm regularly, e.g. machinery safety covers, PTO guards, fire extinguishers and First Aid kits.
J	**JAWS:** Keep away from blades of shear grabs, mowers, revolving knives and chainsaws.
K	**KEEP CLEAR** of machinery such as tractors, HiMacs, bulldozers when they are working. Stay in their line of vision and wear a high visibility jacket or vest.
L	**LIVESTOCK:** Be wary of being kicked or crushed while working in pens, yards or fields with livestock.
M	**MACHINERY:** Ensure safety covers and PTO guards are in place and working on all farm machinery. Avoid wearing loose clothing near machinery.
N	**NEVER** start a tractor when you are standing on the ground alongside it.
O	**OVERTURN:** Remember tractors have a high centre of gravity and can overturn easily. Drive slowly over uneven ground.
P	**PESTICIDES** and other toxic chemicals: Keep them out of the reach of children. Read the label and follow the manufacturer's advice on proper use, storage and disposal.
Q	**QUAD bikes:** Always wear a safety helmet when using a quad bike. Avoid letting children on them. Drive slowly over rough ground.
R	**ROOFS:** Use a roofing ladder when working on farm sheds. Stay clear of skylights.
S	**SAFETY:** Complete and update your Risk Assessment Document. This can be completed online at www.farmsafely.com. Take action on risks highlighted.
T	**TRAINING:** Attend a Farm Safety training course NOW at your local Teagasc centre.
U	**UNTIDY:** Poorly maintained farmyards/farm can lead to accidents. Keep your farmyard/farm neat, tidy and well maintained.
V	**VISION:** Your eyesight is vital – protect it. Wear safety goggles where your eyes are in danger.
W	**WARNING SIGNS** should be erected to warn the public of dangers or hazards such as "Tractors Crossing", "Beware of Bull".
X	**XTRA:** Be extra careful when there are children or elderly people on the family farm. Restrict access to dangerous ponds, tanks, unstable heights etc.
Y	**YOU and YOUR FAMILY:** Take every precaution to remain safe and healthy. Assess every farm task carefully for potential dangers or risks. Organise and complete tasks with safety in mind.
Z	**ZOONOTIC DISEASES** and infections which can be transmitted from animals to humans. E.g. TB, Toxoplasmosis, Weil's Disease, E.Coli ... Wear gloves when handling livestock. Always wash your hands after being in contact with animals.

REMEMBER: HEALTH IS WEALTH. THINK SAFETY. BE SAFE!

Thank you for your attention and safe home!