ADDRESSING SKEPTICISM ABOUT FODDER'S NUTRITIONAL CLAIMS

Why thin pre-2024 research and dry-matter math made nutritionists cautious, and what the new evidence shows today.

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ABSTRACT

RECONCILING DRY-MATTER ECONOMICS WITH A MATURING RESEARCH BASE

This whitepaper sets out the operational and animal-health case for hydroponic green fodder as a daily ration supplement: feed security independent of hay markets and drought, water use of less than a quarter gallon per pound produced, day-to-day nutritional consistency, and documented animal-health outcomes at appropriate inclusion rates. It then addresses the two components of nutritional skepticism that nutritionists and extension services raise against that case: cost math and evidence quality. Using Eleusis's own pricing alongside dry-matter figures reported across the current peer-reviewed literature, it shows that wet-basis pricing understates the true dry-matter cost of fodder, a discrepancy that nutritionists are correct to flag and that Eleusis does not dispute. It then reviews the research record, noting that rigorous, controlled trials were sparse before 2024 and that a substantially larger, more methodologically consistent body of work, including a 2025 PRISMA-guided systematic review of 28 studies, has since emerged. The paper concludes that the appropriate response to the cost objection is not to contest the math, but to present it transparently alongside the case for fodder as a supplement rather than a hay replacement, at inclusion rates the evidence supports.

EXECUTIVE SUMMARY

FODDER SOLVES PROBLEMS HAY CANNOT

Ranchers install Green Sprout because it solves problems hay cannot solve. It is produced on-site every day, independent of hay markets, drought conditions, or transport logistics. It uses less than one quarter of a gallon of water per pound produced, against more than 40 gallons for the equivalent weight of hay. It delivers the same nutritional value every day of the year, reducing the batch-testing burden hay creates, and it supports documented animal-health outcomes at appropriate inclusion rates. That is the case Eleusis makes for it.

< 0.25 GAL	30% – 50%	7 DAYS	5% – 25%
WATER PER LB PRODUCED	TYPICAL RATION INCLUSION	GROW CYCLE, EVERY DAY OF THE YEAR	DRY MATTER INCLUSION SHOWN TO AID INTAKE

KEY FINDINGS

Part of making that case honestly is giving nutritionists the same numbers Eleusis works from. Wet-basis pricing of $0.05 to $0.06 per pound looks inexpensive next to hay until it is converted to a dry-matter basis, and Eleusis does not dispute that math. What was thin until 2024 was not the price math but the research record behind fodder's nutritional benefits. A 2025 systematic review of 28 controlled studies, along with parallel species-specific trials published in 2024 and 2025, now shows that moderate inclusion improves intake, digestibility, and growth, while confirming that fodder cannot replace hay as a sole diet.

The case for Green Sprout was never that it is the cheapest source of dry matter. It is that it solves problems hay cannot solve, particularly in drought conditions where hay may not be available at any price.

Operators who bring dry-matter figures to their nutritionist early, alongside this case, move through evaluation considerably faster.

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INTRODUCTION

WHY THIS OBJECTION RANKS WHERE IT DOES

In Eleusis' own review of adoption barriers across its livestock operator pipeline, skepticism about nutritional claims ranks fifth among the ten most significant challenges to purchase, trailing hay price volatility, upfront capital cost, contamination control, and energy costs. It is flagged as rising fast, with consistent complaint signal surfacing in nutritionist reviews, extension service critiques, and online forums. Unlike some of the other barriers on that list, this one is not primarily financial. It is epistemic. Operators are ready to buy, but their trusted advisor is not yet ready to sign off.

That advisor's caution is grounded in two distinct issues that are frequently conflated. The first is a straightforward unit-conversion problem: hydroponic fodder is harvested at very high moisture content, and a wet-weight price comparison against cured hay is not an apples-to-apples comparison of nutritional value. The second is a track record problem: the hydroponic fodder industry has, for decades, made broad claims about productivity and animal performance that were not always backed by rigorous, independent research.

This whitepaper addresses both directly. It walks through the dry-matter math without softening it, summarizes what has changed in the research literature since 2024, and lays out what the current evidence does and does not support. The goal is not to argue the objection away. It is to give ranchers, dairy nutritionists, and extension contacts the same numbers Eleusis works from, so that the conversation with a nutritionist starts from shared facts rather than a sales sheet.

WHY RANCHERS ADOPT IT

The case for Green Sprout was never that it is the cheapest source of dry matter. It is that it solves problems hay cannot solve, particularly in drought conditions where hay may not be available at any price.

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WATER PER LB PRODUCED	TYPICAL RATION INCLUSION	GROW CYCLE, EVERY DAY OF THE YEAR	DRY MATTER INCLUSION SHOWN TO AID INTAKE

- **Feed security.** Fodder is produced on-site, every day, independent of hay markets, drought conditions, or transport logistics.
- **Consistency.** The same living feed ingredient is produced the same way every day, which reduces the batch-testing burden hay creates for nutritionists managing ration precision.
- **Animal health.** Reduced colic risk in horses, improved digestibility, and higher palatability are documented outcomes at appropriate inclusion rates.
- **Water efficiency.** Producing one pound of fodder requires less than one quarter of a gallon of water, against more than 40 gallons for the equivalent weight of hay.

PUTTING WET-WEIGHT PRICING IN CONTEXT

None of this changes what a pound of fodder costs on a dry-matter basis, and Eleusis leads with that number rather than waiting for a nutritionist to find it. Hydroponic barley sprouts are harvested at very high moisture content. Across a 2025 systematic review of 21 studies reporting composition data, hydroponic barley sprouts averaged 10.5 percent dry matter, with crude protein at 14.8 percent, ether extract at 3.6 percent, and NDF at 12.9 percent, all expressed on a dry-matter basis. A separate 2024 broiler trial measured dry matter in fresh hydroponic barley fodder at 13.2 percent, compared with 88.45 percent in the unsprouted seed. Both figures are consistent with what Eleusis observes in its own systems.

Hay, by contrast, is typically cured to 85 to 90 percent dry matter. That difference is why a wet-weight price comparison between fodder and hay is not comparing like quantities of nutrition, and any nutritionist trained to think in dry-matter intake will identify that immediately.

FEED TYPE	WET BASIS COST/LB	APPROX DRY MATTER	DRY MATTER COST/LB
Green Sprout (wet, as harvested)	$0.05 – $0.06	~10% – 13%	$0.45 – $0.55
Conventional hay (cured)	$0.10 – $0.15*	~85% – 90%	$0.12 – $0.17*

**Regional hay pricing varies with cutting, quality, and local supply conditions; figures shown are illustrative, not a quote.*

RESEARCH WAS SPARSE UNTIL 2024. THAT IS CHANGING.

The claim-repeatability concern is grounded in real history. For decades, hydroponic fodder producers made broad productivity and nutrition claims, and researchers have openly noted that some of those claims amounted to over-advertising by the industry, unsupported by rigorous trial data. Extension services that grew skeptical over that period had good reason.

That picture has shifted. A systematic review published in 2025 evaluated 28 peer-reviewed, controlled, in-vivo studies of hydroponic forage in ruminants, screened under PRISMA 2020 methodology across Scopus, Web of Science, PubMed, and Google Scholar. The scale and rigor of that review would not have been possible even three years earlier, because the underlying study base did not yet exist. A parallel body of species-specific work published in 2024 and 2025, spanning broilers, laying quail, dairy cattle, and small ruminants, has filled in much of what was previously anecdotal.

WHAT THE ACCUMULATED EVIDENCE SUPPORTS

- Moderate inclusion, in the range of 5 to 25 percent of dietary dry matter, improved intake, digestibility, and growth performance in small ruminants and growing animals across multiple controlled trials.
- In dairy cattle, hydroponic forage inclusion improved milk fat content and shifted the fatty acid profile toward more oleic, linoleic, and alpha-linolenic acid, without reducing milk yield.
- Sprouting improves several nutritional characteristics relative to the unsprouted grain, including protein availability, consistent with the enzymatic breakdown that occurs during germination.

WHAT THE EVIDENCE DOES NOT SUPPORT

- Hydroponic fodder fed as a sole diet, replacing forage entirely, produced dry-matter intake below maintenance and negative nitrogen and mineral balances in the sheep trials that tested it.
- Excessive replacement of conventional feed beyond the moderate-inclusion range reduced intake or digestibility in several studies, most likely tied to rumen microbial adaptation.
- No study in the current record supports a dry-matter cost advantage over hay. **The value case for fodder is nutritional and operational, not a cheaper source of dry matter.**

BEFORE A NUTRITIONIST SIGNS OFF

The fastest path through this objection is transparency, not persuasion. Operators who bring their nutritionist into the conversation early, and who present dry-matter figures alongside wet-weight pricing from the outset, consistently move through evaluation faster than operators who wait for the nutritionist to uncover the dry-matter math on their own.

- Share dry-matter and as-fed values together. Do not lead with wet-weight cost per pound in isolation.
- Design ration inclusion at 30 to 50 percent of the as-fed ration, in line with what the research base supports on a dry-matter basis, and frame it explicitly as a supplement, not a hay replacement.
- Connect the nutritionist with Eleusis' network of animal nutritionists, who can help translate system output into ration-specific inclusion recommendations for the operation's species and production goals.
- Point to the current peer-reviewed record rather than legacy marketing claims. The evidence base has changed meaningfully since 2024, and it holds up to scrutiny.

CONCLUSION

AN HONEST ANSWER, NOT A BETTER SALES PITCH

Skepticism about nutritional claims is not an obstacle to overcome with better marketing. It is a fair question that deserves a fair answer, and the answer has changed. Extension services are correct that Green Sprout's dry-matter cost exceeds hay's, and Eleusis does not suggest otherwise. What has shifted is the research record beneath the animal-health and operational case: a peer-reviewed literature that was thin before 2024 has since matured into controlled, replicated evidence supporting moderate inclusion, and confirming just as clearly that fodder is a supplement rather than a substitute for hay. Ranchers who bring their nutritionist dry-matter figures alongside wet-weight pricing, and who frame Green Sprout as the 30 to 50 percent daily supplement it is designed to be, are not asking their nutritionist to take anything on faith.

Feed security built on honest numbers is the only kind worth building.

FREQUENTLY ASKED QUESTIONS

Why does Green Sprout cost $0.05 to $0.06 per pound when my extension service calculates $0.45 to $0.55?

Both numbers are correct. The lower figure is Eleusis' wet, as-harvested price. The higher figure is that same feed converted to a dry-matter basis, which is how nutritionists compare feeds on nutritional value. Fodder is roughly 10 to 13 percent dry matter, so dividing the wet-basis price by that fraction produces the higher number.

Is hydroponic fodder research reliable now?

More reliable than at any point in the industry's history. A 2025 systematic review screened 28 controlled, in-vivo studies under PRISMA 2020 methodology, and a wave of species-specific trials published in 2024 and 2025 has filled gaps that were previously anecdotal. Older, thinner studies and industry-sponsored claims are why extension services grew cautious in the first place, and that caution was reasonable at the time.

Can Green Sprout replace hay entirely?

No, and the research explains why. Trials that fed hydroponic fodder as a sole diet, without conventional forage, produced dry-matter intake below maintenance and negative nitrogen and mineral balances in the animals studied. Eleusis does not positioned Green Sprout as a hay replacement; it is a daily supplement.

What ration inclusion rate does the evidence actually support?

Controlled trials show benefits to intake, digestibility, and growth at 5 to 25 percent of dietary dry matter. Eleusis' standard guidance of 30 to 50 percent of the as-fed ration is a larger share of wet weight, but because fodder is roughly 90 percent water, that as-fed inclusion typically contributes a smaller share of total dietary dry matter, often landing near the range the research supports. A nutritionist should confirm the exact figure for a specific ration.

If it costs more per pound of dry matter, why do ranchers still buy it?

Because dry-matter cost is not the only variable that matters in a feed security decision. Fodder is produced on-site every day, independent of hay markets or drought conditions, uses less than a quarter gallon of water per pound produced against more than 40 gallons for hay, and offers day-to-day nutritional consistency that reduces the batch-testing burden hay creates.

What should I bring to my nutritionist to speed up their review?

Dry-matter and as-fed values together, not wet-weight pricing alone. Eleusis can also connect nutritionists directly with its network of animal nutritionists for ration-specific inclusion recommendations, and can point to the current peer-reviewed literature rather than legacy marketing claims.

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