Aviv Asher **January 2026**

Part I: CURRICULUM VITAE

1. Personal

Dr. Aviv Asher
Born: 1978, Israel.
Marital status: Married + 3
Army service: 1996-2001
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2. University Education and Additional Training

Dates	Description
2002 – 2006	B.Sc. in Animal Sciences at the Hebrew University of Jerusalem, The Robert H. Smith Faculty of Agriculture.
2006 – 2010	M.Sc. in Animal Sciences at the Hebrew University of Jerusalem, The Robert H. Smith Faculty of Agriculture. Title of thesis: The influence of period in lactation on the energy expenditure and the efficiency characters in Holstein cows. Supervision by: Dr Arieh Brosh, Beef Cattle section, Newe-Ya'ar Research Center, ARO. Supervision by: Prof. Arieli Amichai, Department of Animal Sciences, Hebrew University of Jerusalem.
2011 – 2016	Ph.D. in Animal Sciences at the University of Haifa, Faculty of Natural Sciences. Title of thesis: Identification of individual efficiency characters in Holstein cows and bulls and the effect of photoperiod on production efficiency. Supervision by: Prof. Abraham Haim, Department of Evolutionary and Environmental Biology, University of Haifa and Dr. Arieh Brosh, Beef Cattle section, Newe-Ya'ar Research Center, ARO.
2017 – 2018	Postdoctoral Research. Newe-Ya'ar Research Center, ARO and University of Haifa. Title of Postdoctoral Research: The influence of artificial light at night on individual feed intake, growth, health and welfare of prepubertal Holstein calves. Supervision by: Dr. Ariel Shabtay, Beef Cattle section, Newe-Ya'ar Research Center, ARO and Prof. Abraham Haim , Department of Evolutionary and Environmental Biology, University of Haifa and.

3. Positions Held and Academic Status

Dates	Description
2008-2011	Research Assistant in the dairy Cattle section, The Volcani Center, ARO.
2011-2013	Teaching Assistant at the Biology Department at the University of Haifa. Tutored the courses "Animal Physiology" and "Vertebrate Zoology".
2014-2022	Teaching the course "Vertebrate Zoology" at the Biology Department at the University of Haifa.
2019-to date	Teaching the course: "Beef Cattle husbandry in naturals and intensive systems" in Tel Hai College, Dept. of Animal Sciences.

2015-to date	Teaching the course "Beef cattle management "at the Hebrew University.
2016	Research Scientist (P.I.) at Migal-Northern Agriculture R&D
2019	Promoted to rank B, (equivalent to "Senior Lecturer") at Migal-Northern Agriculture R&D
2023-present	Member of the limited management at Migal-Northern Agriculture R&D

4. Teaching Experience / Guiding Students

A. Academic Contribution:

Dates	Description
2014 to 2022	Teaching the course: "Vertebrate Zoology" in the University of Haifa , Dept. of evolutionary Biology
2015 to date	Teaching the course: "Beef cattle management" in the Faculty of Agriculture, Food and Environment of the Hebrew University of Jerusalem, Dept. of Animal Sciences.
2019 to date	Teaching the course: "Beef Cattle husbandry in naturals and intensive systems" in Tel Hai College, Dept. of Animal Sciences.
2024 to date	Teaching the courses: "Vertebrate Zoology Lab" and “From cell to Organism” in Tel Hai College, Dept. of Animal Sciences.

B. Guidance of M.Sc. Students (or B. Sci. internship)

Graduation date	Name	Title of thesis	Guidance with
2024 M.Sc. (Exp.)	* Mr. Guy Reuveny	Optimization of soil conservation and species diversity grazing interfaces through a timed and adaptive grazing management in fast rotation of grazing cattle	Dr. Roee Gutman, Tel Hai College, Dept. of Animal Sciences.
2024 M.Sc. (Exp.)	* Ms. Yahel Appelbaum	Artificial intelligence in pasture: improving herd and pasture management using remote sensing and real time monitoring of herd and pasture state.	Dr. Dan Mankinson, Haifa university, Dept. Environmental Studies.
2020 M.Sc. (Exp.)	* Ms. Florin Fares	The influence of artificial light at night on performance and feed efficiency of dairy cows and goats	Dr. Roee Gutman, Tel Hai College, Dept. of Animal Sciences.
2019 M.Sc.	* Ms. Matan Fialiko	The influence of artificial light at night on milk yield and components, fatty and amino acids	Dr. Roee Gutman, Tel Hai College, Dept. of Animal Sciences.

2019 (** B. Sci. internship)	* Mr. Tomas Mccowen	The use of quinoa (Chenopodium quinoa Willd) as a new forage crop and its effect on performance, individual production and feed efficiency of beef cattle.	Dr. Liora Shealtiel, Tel Hai College, Dept. of Animal Sciences
2017 (** B. Sci. internship)	* Mr. Allan Pederson	The influence of artificial light at night on growth and feed efficiency of dairy bull calves	Dr. Shullamit Zonenberg, Ruppin College, Dept. of Animal Sciences.

C. Post-Docs and Visiting Scientists:

Dates	Name	Research subject
2019 (In the research team).	Dr. Yifat Carmi ^{PD} (Tel Hai College)	The influence of LED illumination on immune system and feed efficiency of ruminants
2019 (Fellowship in my lab).	Dr. Travis Whitney ^{VS} (Texas A&M university, U.S)	The use of quinoa (Chenopodium quinoa Willd) as a new forage crop and its effect on performance, feed efficiency and gas emission of beef and dairy cattle.

X^{PD}: Post-Doc working in my research team.
X^{VS}: Visiting Scientist working in my research team

5. Activity in Scientific and Agricultural Committees

A. International:

Dates	Description and role
2019	Management Committee of the COST meeting on elevating feed efficiency and reducing gas emission of livestock; Member

B. National:

Dates	Description and role
2019-2020	Beef cattle Growers Council Committee; Member
2017 – 2023	Member, Israeli Dairy cattle Board – Beef cattle committee.
2023 to date	Member, Chief Scientist of the Ministry of Agriculture – Climate change committee

6. Contribution to the Scientific Community

A. International:

Dates	Description

2019	Organizer of COST meeting on elevating feed efficiency and reducing gas emission of livestock. The meeting accrued in the Galilion Hotell, Hahula valley

B. National:

Dates	Description
2019	Organizer and Chair of a Session on Quinoa as a new forage crop, in the Annual Meeting of the Israeli Society of the northern forage crop growers

C. Outreach:

Dates	Description
2018-2023	Reviewer (ad-hoc) of proposals for: The Chief Scientist, ISF
2018-2023	Reviewer (ad-hoc) of proposals for: Israeli Dairy cattle Board

D. Editorial responsibilities:

Dates	Description
2018-2023	Reviewer (ad-hoc) of manuscripts for: Journal of Small ruminant science
2018-2020	Reviewer (ad-hoc) of manuscripts for: Journal of Dairy science

7. Active Participation in Meetings

A. International:

Date	Title of the Meeting	Place	Role
2014	The 30th International Symposium of Harnessing the Ecology and Physiology of Herbivores (ISNH/ISRP),	Canberra, Australia	Posters (3) and peer reviewed papers (3)
2017	The 68th meeting of European Federation of Animal Science.	Tallinn, Estonia	Posters (1) and peer reviewed papers (1)
2018	The 31th International Symposium of Harnessing the Ecology and Physiology of Herbivores (ISNH/ISRP).	Clermont Ferrand, France	Posters (2) and peer reviewed papers (2)
2023	"The dark side of the light": The effect of modern Artificial Light at Night (ALAN) on welfare, production and feed efficiency of livestock,11th International Symposium on the Nutrition of Herbivores.	Florianopolis, Brazil	Invited lecture peer reviewed papers (1)
2024	Night nutrition and light pollution: The effect of modern Artificial Light at Night (ALAN) on human health and nutritional solutions, 2th International Symposium on functional food, 2023	Copenhagen, Denmark	Invited lecture

B. National:

Date	Title of the Meeting	Role
2014	The 26th Annual Meeting of Cattle Sciences, Ashkelon, Israel.	Abstract and oral presentation
2015	The 27th Annual Meeting of Cattle Sciences, Jerusalem, Israel.	Abstract and oral presentation
2016	The 28th Annual Meeting of Cattle Sciences, Jerusalem, Israel.	Abstract and oral presentation
2017	The Annual Meeting of Animal Sciences, Tel-Hai college, Israel.	Abstract and oral presentation
2017	The 29th Annual Meeting of Cattle Sciences, Jerusalem, Israel.	Abstract and oral presentation
2018	The 30th Annual Meeting of Cattle Sciences, Jerusalem, Israel.	Abstract and oral presentation
2019	The 31th Annual Meeting of Cattle Sciences, Jerusalem, Israel.	Abstract and oral presentation (Invited Lectures)
2019	Annual meeting of agricultural innovation, Golan Heights and Galilee	Invited Lecture
2020	The 32th Annual Meeting of Cattle Sciences, Jerusalem, Israel.	Abstract and oral presentation (Invited Lectures)
2022	The 33th Annual Meeting of Cattle Sciences, Jerusalem, Israel.	Abstract and oral presentation (Invited Lectures)
2022	The 18th Annual Meeting of sheep and goat Sciences, Bait dagan, Israel.	Abstract and oral presentation
2022	The 34th Annual Meeting of Cattle Sciences, Jerusalem, Israel.	Abstract and oral presentation (Invited Lectures)
2024	The 35th Annual Meeting of Cattle Sciences, Jerusalem, Israel.	Abstract and oral presentation (Invited Lectures)

8. Research Grants

A. Internationally Peer Reviewed Grants:

Year	Granting Source	Duration (years)	Role *	Title (short)	Budget	
					Total (US $ / year)	Researcher (US $ / year)
2023 - 2026	ERA-NET COFUND ICT-	3	PI	Development of a practical data management system with embedded sensors for improved environmental	300,000	100,000

	AGRI-FOOD			management and transparency of dairy farming		
2019 - 2021	Horizon 2020	3	PI	Precision livestock farming based on grazing behavior of beef cattle at pasture.	250,000	150,000
2019	BARD (fellowship)	1	LPI	The use of Quinoa as a new forage crop	30,000	30,000

*PI = Principal Investigator; LPI= Local Principal Investigator; CI = Cooperating Investigator

B. Nationally Peer Reviewed Grants:

Year	Granting Source	Duration (years)	Role*	Title (short)	Total (US $ / year)	Researcher (US $ / year)
2023 - 2026	Chief Scientist of the Ministry of Agriculture	3	PI	Artificial intelligence in pasture: improving herd and pasture management using remote sensing and real time monitoring of herd and pasture state	60,000	60,000
2023 - 2026	Chief Scientist of the Ministry of Agriculture	3	PI	Light pollution and its effect on animal welfare: The effect of short wavelength LED illumination on the welfare, health and production of fattening lambs	45,000	45,000
2023 - 2026	Chief Scientist of the Ministry of Agriculture	3	PI	The use of quinoa (Chenopodium quinoa Willd.) as a new forage crop to improve production efficiency and profitability of the sheep industry in Israel.	45,000	45,000
2023 - 2026	Chief Scientist of the Ministry of Agriculture	3	PI	Optimization of soil conservation and species diversity grazing interfaces through a timed and adaptive grazing management in fast rotation of grazing cattle	30,000	30,000
2019 - 2020	The International Contraceptive Access (ICA) Foundation	1	PI	The effect of LED light on milk production on dairy cows	30,000	30,000

2019 - 2020	The International Contraceptive Access (ICA) Foundation	1	PI	The use of Quinoa as a new forage crop for fattening lambs	24,000	24,000
2019 - 2022	Nitzan- Noah's ark: Chief Scientist of the Ministry of Agriculture	3	PI	"Night milk": Dairy milk and milk products naturally enriched with Melatonin	100,000	100,000
2017 - 2020	Galilee Technology Center – "Migal"	3	PI	Goat milk naturally enriched with Melatonin	24,500	24,500
2018 - 2019	The International Contraceptive Access (ICA) Foundation	1	PI	The effect of LED light on milk production	14,500	14,500
2018 - 2021	Israeli Dairy Board	3	PI	The use of Quinoa as a new forage crop	62,500	62,500
2018 - 2021	Chief Scientist of the Ministry of Agriculture	3	PI	Development of Quinoa as new forage crop in Israel	20,000	20,000
2017 - 2020	Israeli Beef cattle Board	3	PI	The use of proceeding livestock farming on grazing cattle	53,000	53,000
2017 - 2018	Galilee Technology Center – "Migal"	1	PI	Pasteurized effect on goat milk naturally enriched with Melatonin	14,500	14,500
2017 - 2020	Israeli Dairy cattle Board	3	PI	The effects of artificial light on feed efficiency and milk production of dairy cows	70,000	70,000
2017 - 2020	Israeli Dairy cattle Board	3	PI	The effects of artificial light on feed efficiency and milk production of dairy goats	72,000	72,000

9. Awards

Dates	Description
2008	The 20th Annual Meeting of Cattle Sciences, Jerusalem, Israel. Award for Excellence.
2009	The Elie Peles scholarship, Afikim, Israel.
2009	The Yossi Leffer scholarship, Baran Industries, Israel.
2010	The 22th Annual Meeting of Cattle Sciences, Jerusalem, Israel. Award for Excellence.

2011	The 23th Annual Meeting of Cattle Sciences, Jerusalem, Israel. Award for Excellence.
2013	The Annual Meeting of the Valley Farmers Center LTD, Israel. Award in Excellence.
2013	The Jewish Agency for Israel and UGA Federation of New York scholarship, Israel.
2014	The 26th Annual Meeting of Cattle Sciences, Jerusalem, Israel. Award for Excellence.

Aviv Asher **January**

2026

Part II: LIST OF PUBLICATIONS

Marks:	
X*	Equal contribution as the first author
X**	Corresponding Author *(in cases where the researcher is the Corresponding Author)*
Marks (only for the first author):	
X^S	Student under my supervision
X^T	Technician or research engineer working in my research team
X^PD, X^VS	Post-Doc or Visiting Scientist working in my research team

1. Articles in Reviewed Journals

1. Rubinovich, L., Dagan, R., Galili, S., & **Asher, A**. (2025). Optimizing Protein-Rich Young Vegetative Quinoa (Chenopodium quinoa) Growth: Effects of Inter-Row Spacing and Genotype in Mediterranean Summer Cultivation. Agronomy, 15(5), 1102.
   IF: 3.6; Category: Agronomy and Crop Science, Q1, Rank: 18/91).
2. Cohen-Zinder, M., Shabtay, A., Shor-Shimioni, E., Honig, H. H., **Asher, A**., Friedman, S., Ross, M., Yitzhak, N., Shilo-Benjamini, Y., & Salzer, Y. (2025). Biotinidase as a novel biomarker for pain assessment in dairy cattle. PAIN Reports, 10(6), e1338.
   IF: 3.2; Category: Pain Research; Rank: 32/89 (Q1).
3. Bellalou, A., Rubinovich, L., **Asher, A.** Deutch-Traubman, T., Galili, L., Malede, I., & Galili, S. (2025). Influence of row spacing and harvest date on Cephalaria joppensis performance as a forage crop. The Journal of Agricultural Science, 1-9.
   IF: 2.2; Category: Agriculture, Multidisciplinary; Rank: 32/89 (Q2).
4. Bellalou, A., Rubinovich, L., **Asher, A**., Dekalo-Keren, M., Abu-Aklin, W., Sokolskaya, R & Galili, S. (2024). Effect of sowing date of quinoa (Chenopodium quinoa) mother plants on germination of their seeds. Seed Science and Technology, 52(1), 17-27.
   IF: 1.45; Category: Seed Science and Technology; Rank: 41/91 (Q2).
5. Rubinovich, L., Dagan, R., Lugasi, Y., Galili, S., & **Asher, A.** (2023). The potential of young vegetative quinoa (Chenopodium quinoa) as a new sustainable protein-rich winter leafy crop under Mediterranean climate. Plos one, 18(12), e0290000.
   IF 3.73; Category: Agriculture, Multidisciplinary; Rank 17/55 (Q1)

6. **Asher, A**., & Brosh, A. (2022). Decision Support System (DSS) for Managing a Beef Herd and Its Grazing Habitat's Sustainability: Biological/Agricultural Basis of the Technology and Its Validation. Agronomy, 12(2), 288.
   IF 3.18; Category: Agronomy; Rank 35/94 (Q1)
7. **Asher, A**., Fialko, M., Fares, F., Moallem, U., Yaacoby, S., & Gutman, R. (2022). The Effect of Short-Wavelength White LED Illumination throughout the Night on the Milk Fatty Acid Profile of High-Yielding Dairy Cows. Biology, 11(12), 1799.
   IF 5.87; Category: Biology; Rank 52/158 (Q1)
8. **Asher, A**., Dagan, R., Galili, S., & Rubinovich, L. (2022). Effect of Row Spacing on Quinoa (Chenopodium quinoa) Growth, Yield, and Grain Quality under a Mediterranean Climate. Agriculture, 12(9), 1298.
   IF 2.91; Category: Agronomy; Rank 53/94 (Q1)
9. Bellalou, A., Daklo-Keren, M., Aklin, W. A., Sokolskaya, R., Rubinovich, L., **Asher, A**., & Galili, S. (2022). Germination of Chenopodium quinoa 'Mint Vanilla' seeds under different abiotic stress conditions. Seed Science and Technology, 50(1-2), 41-45.
   IF 1.67; Category: Plant Sciences; Rank 145/276 (Q2)
10. **Asher, A***., Galili, S., Whitney, T., & Rubinovich, L. (2020). The potential of quinoa (Chenopodium quinoa) cultivation in Israel as a dual-purpose crop for grain production and livestock feed. Scientia Horticulturae, 272, 109534.
   IF 2.68; Category: Horticulture; Rank 26/114 (Q1)
11. Cohen-Zinder, M., Lipkin, E., Shor-Shimoni, E., Ben-Meir, Y., Agmon, R., **Asher, A** & Shabtay, A. (2019). FABP4 gene has a very large effect on feed efficiency in lactating Israeli Holstein cows. Physiological Genomics, 51(10), 481-487.
   IF 2.75; Category: Genetics and Heredity; Rank 96/178 (Q1)

12. Last rank (effective from 2019) אישור דרגה ב

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13. **Asher, A.** *, A. Shabtay, M. Cohen-Zinder, Y. Aharoni, J. Miron, R. Agmon, I . Halachmi, A. Orlov, A. Haim, L.O. Tedeschi, G. E. Carstens, K. A. Johnson and A .Brosh. (2018). The Consistency of Feed Efficiency Ranking and the Mechanism Explaining Efficiency Variation among Growing Calves. Journal of Animal Science, 96(3), 990-1009.
   IF 1.69; Category: Agriculture, dairy and Animal Science; Rank 16/61 (Q1)

14. Galili, S., Hovav, R., Bellalou, A., Amir-Segev, O., Badani, H., Deutch, T., Rubinovich, L., **Asher, A** & Singer, A. (2018). Utilization of natural variation in Cephalaria joppensis to diversify wheat forage crop rotation in Israel. Israel Journal of Plant Sciences, 65(3-4), 195-201.12.
    IF 0.98; Category: Plant Sciences; Rank 252/335 (Q2)
15. Cohen-Zinder, M., **Asher, A.**, Lipkin, E., Feingersch, R., Agmon, R., Karasik, D, & Shabtay, A. (2016). FABP4 is a leading candidate gene associated with residual feed intake in growing Holstein calves. Physiological genomics, 48(5), 367-376. Physiological genomics, 48(5), 367-376.
    IF 3.04; Category: Genetics and Heredity; Rank 68/86 (Q1)
16. Cohen-Zinder, M., Lipkin, E., Agmon, R., **Asher, A.**, Brosh, A., & Shabtay, A. (2016). P5022 Identification of genetic markers associated with feeding efficiency in fattening Holstein calves, using targeted sequence capture. Journal of Animal Science, 94 (supplement 4), 126-126.
    IF 1.86; Category: Agriculture, dairy and Animal Science; Rank 8/58 (Q1)
17. **Asher, A*.**, Shabtay A, Brosh A, Eitam H, Agmon R, Zubidat AE, Cohen-Zinder M and Haim A. (2015). "Chrono-functional milk": The difference between melatonin concentrations in night-milk versus day-milk under different night illumination conditions. Chronobiol. Int. 32(10), pp.1409-1416.
    IF 3.54; Category: Biology; Rank 13/86 (Q1)
18. **Asher, A.**, A. Shabtay, A. Haim, Y. Aharoni, J. Miron, G. Adin, A. Tamir, A. Arieli, I. Halachmi, U. Moallem, A. Orlov, and A. Brosh (2014). Time required determining performance variables and production efficiency of lactating dairy cows. Journal of Dairy Science. 97:4340–4353.
    IF 3.43; Category: Agriculture, Dairy and Animal Science; Rank 5/63 (Q1)
19. Eitam, H., R. Agmon, **A**. **Asher,** A. Brosh, A. Orlov, I. Izhaki and A. Shabtay (2012). Protein deprivation attenuates Hsp and proteasome expression in fat tissue. Cell Stress & Chaperones 17: 339-347.
    IF 2.48; Category: Genetics and Molecular Biology; Rank 11/79 (Q1)
20. Halachmi I., A. Shabtay**, A. Asher**, R. Agmon, A. Orlov, M. Mazaribe, A. Zuabi, and A. Brosh (2011).Intake Based Milk Allocation Improves Health and Growth of Calves. The Open Agriculture Journal, 2011. 5: p. 37-45.

21. Miron, J., G. Adin, R. Solomon, M. Nikbachat, A. Zenou, E. Yosef, A. Brosh, A. Shabtay, **A. Asher,** H. Gacitua, M. Kaima, S. Yaacobi, Y. Portnik, S.J. Mabjeesh. (2010). Effects of feeding cows in early lactation with soy hulls as partial forage replacement on heat production, retained energy and performance. Animal Feed Science and Technology 155: 9-17

IF 1.72; Category: Agriculture, dairy and Animal Science; Rank 7/56 (Q1)

2. Book Chapters

Brosh, A., & **Asher, A.** (2024). New Management Techniques for Increasing the Efficiency and Production Rates of the Natural Grazing Land and the Grazing Herds and Fed Herds, and their Effect on Reducing Global Warming.

2. Articles in Reviewed Journals in Hebrew

1. **Asher, A**. Milgar, M. Leybovich H. and Rubinovich L. 2025. Feeding dairy small ruminants with quinoa fodder – experimental results in goats and sheep. HaRefet Ve HaChalav., 129: 17-20

2. **Asher, A**., Brosh A, Eitam H, Agmon R, Zubidat AE, Cohen-Zinder M and Shabtay, A. 2024. The influence of artificial light at night on performance and feed efficiency of beef cattle. Yediot labokrim, 138:9-12.

3. **Asher, A**. Solomon, R. and Shabtay., A**.** 2022. "The dark side of the light": influence of artificial light at night on performance and feed efficiency of dairy cows and calves milk production. *Meshek Habakar Vehachalav*, 415: 90-96.

4. **Asher, A**. Galili., S. and Rubinovich, L. 2023.The use of quinoa (Chenopodium quinoa) as a new forage crop and its effect on productivity and production efficiency in cattle fattening. Yediot labokrim, 135:24-27.

5. **Asher, A**. and Rubinovich, L. 2021.The use of quinoa (Chenopodium quinoa) as a new forage crop and supper feed for dairy cows. *Meshek Habakar Vehachalav*, 395: 82-85.

6. **Last rank (effective from 2019) אישור דרגה ב**

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7. **Asher, A.** Sadan., A. Galili., S. and Rubinovich., L. 2018. Potential evaluation of Quinoa (Chenopodium quinoa) as a new winter crop. Nir Va Telem, 75:22-28.

8. **Asher, A**, Galili., S. and Rubinovich., L**.** 2017. The development of Quinoa (*Chenopodium quinoa*) as a new crop in Israel- observation summery. Nir Va Telem, 71:21-26.

3. Articles in Symposia Proceedings (including Acta Horticulture)

1. **Asher, A**. Gutman, Roee. Moallem, Uzi. Fares, F. Cohen-Zinder, Miri & Shabtay, A. (2023). O18 The dark side of the light: the effect of led illumination on feed efficiency, production and welfare of livestock. Animal - science proceedings. 14. 558-559. 10.1016/j.anscip.2023.04.019.
2. **Asher A.**, A. Haim, R. Agmon, I. Halachmi, A. Orlov, M. Cohen-Zinder, A. Brosh, A. Shabtay. 2016. The Influence of Artificial light at night on performance, feed efficiency and behavior at suckling stage and during growth of Holstein bull calves. The 28th Annual Meeting of Cattle Sciences, Renaissance Hotel, Jerusalem, Israel, pp. 115-116. Abstract and oral presentation.
3. **Asher A.**, A. Haim, R. Agmon, I. Halachmi, A. Orlov, M. Cohen-Zinder, A. Brosh, A. Shabtay. 2015. The Influence of Artificial light at night on performance, feed efficiency and behavior of suckling Holstein calves. The 27th Annual Meeting of Cattle Sciences, Leonardo Hotel, Ashkelon, Israel, pp. 126. Abstract and oral presentation.
4. **Asher A.**, A. Shabtay, A. Haim, Y. Aharoni, J. Miron, R. Agmon, I. Halachmi, A. Orlov, and A. Brosh. 2014. The Influence of Diet and Age on Ranking of Growing Calves According to their Feed Efficiency. The 26th Annual Meeting of Cattle Sciences, Leonardo Hotel, Ashkelon, Israel, pp. 126. Abstract and oral presentation.
5. **Asher A.**, A. Brosh, A. Haim, Y. Aharoni, J. Miron, R. Agmon, I. Halachmi, A. Orlov, A. Shabtay. 2013. Identification of individual efficiency characters in Holstein growing calves. The 25th Annual Meeting of Cattle Sciences, Renaissance Hotel, Jerusalem, Israel, pp. 126-127. Abstract and oral presentation.
6. **Asher A.**, J. Miron, G. Adin, A. Arieli, A. Shabtay, I. Halachmi, U. Moallem, Y. Aharoni, A. Brosh. 2011. Identification of individual efficiency characters in Holstein cows and the effect of photoperiod on production efficiency. The 23th Annual Meeting of Cattle Sciences, Renaissance Hotel, Jerusalem, Israel, pp. 68-69. Abstract and oral presentation.
7. **Asher A.**, J. Miron, G. Adin, A. Arieli, A. Shabtay, I. Halachmi, U. Moallem, Y. Aharoni, A. Brosh . 2010. The influence of week of lactation on production level and the energy balance of the Israeli dairy cow. The 22th Annual Meeting of

Cattle Sciences, Renaissance Hotel, Jerusalem, Israel, pp. 73-74. Abstract and oral presentation.

8. **Asher, A.**, J. Miron, G. Adin , U. Moallem, E. Zenou, A. Shabtay, A. Arieli , I. Halachmi, Y. Aharoni , A. Brosh. 2008. Production efficiency of lactated dairy cows: comparison of tables calculated vs. measured in-vivo ME concentration values. The 20th Annual Meeting of Cattle Sciences, Renaissance Hotel, Jerusalem, Israel, pp. 131-132. Abstract and oral presentation.

Articles in international Symposia Proceedings

1. **Asher**, A. Shabtay, A. Haim, Y. Aharoni , J. Miron, G. Adin, A. Tamir , A. Arieli , I. Halachmi , U. Moallem, A. Orlov and A. Brosh . 2014. Time required determining performance variables and production efficiency of lactating dairy cows. The 30th International Symposium of Harnessing the Ecology and Physiology of Herbivores (ISNH/ISRP), Canberra, Australia, September 8 to 12, Abstract 137.
2. **Asher, A.**, A. Shabtay, A. Haim, Y. Aharoni , J. Miron, G. Adin, A. Tamir , A. Arieli , I. Halachmi , U. Moallem, A. Orlov and A. Brosh . Heat Production and Energy Balance of Holstein Cows throughout Lactation. 2014. The 30th International Symposium of Harnessing the Ecology and Physiology of Herbivores (ISNH/ISRP), Canberra, Australia, September 8 to 12, Abstract 138.
3. **Asher, A.** , A. Shabtay, A. Haim, Y. Aharoni, J. Miron, R. Agmon, I. Halachmi , A. Orlov, and A. Brosh . 2014. The Influence of Diet and Age on Ranking of Growing Calves According to their Feed Efficiency. The 30th International Symposium of Ecology and Physiology of Herbivores (ISNH/ISRP), Canberra, Australia, September 8 to 12, Abstract 195.
4. **Asher A.**, A. Shabtay, M. Cohen-Zinder, Y. Aharoni, J. Miron, R. Agmon, I. Halachmi, A. Orlov, A. Haim, L.O. Tedeschi, G. E. Carstens, K. A. Johnson and A. Brosh. 2017. The Consistency of Feed Efficiency Ranking and the Mechanism Explaining Efficiency Variation among Growing Calves. The 68th meeting of EAAP, Tallinn, Estonia. Abstract and oral presentation.
5. Brosh , A. , **Asher, A**., Miron, J., Shabtay, A., Adin, G., Moallem, U., Aharoni, Y., Arieli, A. 2009. Residual Feed Intake and Heat Production of Holstein Cows throughout Lactation. Abstract and oral presentation, Joint ADSA-CSAS-ASAS Annual Meeting, Montreal Quebec, Canada July 12-16, Abstract 698, Format Oral presentation

6. Brosh, A., **A. Asher**, J. Miron, A. Shabtay, G. Adin, U. Moallem, E. Tahar, S. Abboud and Y. Aharoni. 2009. Heat production of dairy cows under acute and chronic heat load. The 11th International Symposium on Ruminant Physiology (ISRP), Clermont-Ferrand, France, September 6 to 9, 2009.

Part III: DESCRIPTION OF MAJOR ACHIEVEMENTS

3.1 General Overview

My research program focuses on improving the biological efficiency, economic sustainability, and long-term resilience of ruminant production systems through an integrative approach combining animal physiology, nutrition, chronobiology, precision livestock farming, and adaptive grazing management. Across dairy cattle, beef cattle, dairy sheep, meat sheep, and goats, feed costs constitute approximately 60–70% of total production costs, making feed efficiency the dominant economic constraint at the farm, sectoral, and national levels.

A unifying theme of this work is the recognition that efficiency is not a fixed herd-level attribute, but rather an individual biological trait characterized by substantial and repeatable variability. By identifying, quantifying, and mechanistically explaining this variability, my research provides a scientific foundation for transitioning ruminant production from herd-average management toward precision, individual-based optimization. This paradigm shift has direct implications for profitability, resource use efficiency, animal welfare, and environmental sustainability.

3.2 Individual Variability in Feed Efficiency as a Biological and Economic Breakthrough in Dairy cattle

A central scientific contribution of my work is the demonstration that individual ruminants differ by approximately 30–45% in feed efficiency, even when producing similar quantities of milk or achieving comparable growth rates. These differences were consistently observed across diets, physiological stages, ages, and production systems, establishing feed efficiency as a stable biological trait rather than random variation. Quantitatively, inefficient animals required 2–4 kg DM/day more feed to achieve similar production, corresponding to differences of 25–50 MJ of metabolizable energy per day. Over a production cycle or lactation, these differences accumulate to hundreds of kilograms of feed per animal, with major economic implications. Mechanistically, this variability was driven primarily by differences in maintenance energy expenditure, including basal metabolic rate, physical activity, thermoregulation, and metabolic inefficiencies. Inefficient animals consistently allocated a larger proportion of metabolizable energy toward non-productive processes, leaving a smaller fraction available for milk synthesis or tissue accretion.

Scientifically, this work shifted the conceptual framework of feed efficiency from a descriptive performance metric to a physiologically grounded trait. Practically, it enabled farmers to identify inefficient animals without compromising output, supporting targeted interventions, informed culling, and long-term selection strategies. At the national and international levels, these findings contribute to reduced feed imports, lower production costs, and improved sustainability of ruminant agriculture. The research studies based on our projects on individual identification of lactating cows' efficiency, reveals that by measuring the Recovered Energy and Heat Production it is possible to calculate dairy cow's production efficiency without the need for a direct and individual measurement of food intake. This cost-effective method opens a new practical way to select domestic ruminants for greater efficiency. Another important application of these experiments is that quantifying the energetic efficiency of dairy cows using HP has revealed that substantial changes occur as the weeks of lactation advance. Thus, it is critical to measure feed efficiency at a standardized stage of lactation. The studies on individual identification of cattle feed efficiency are also revealed behavior parameters that can explain efficiency values and may be used as markers for identifying the most efficient and most inefficient cattle for future selection for improved production efficiencies. The importance of selection for greater efficiency in cattle is strongly supported by another finding of these projects, which reports that there were 30% individual differences among Holstein dairy cows' efficiencies without any effect on the cows' production rate.

For farmers, these findings provide a physiological basis for identifying persistently inefficient cows, optimizing culling and replacement strategies, improving herd longevity, and reducing lifetime feed costs. At the sector level, adoption of individual efficiency concepts enhances profitability and resilience, while at the national level it reduces reliance on imported feed resources and strengthens food security.

3.3 Stability of Efficiency Ranking and Early-Life Identification in beef cattle

The research I have conducted in beef cattle demonstrated that individual feed efficiency ranking is highly stable across contrasting diets, management systems, and developmental stages. Calves classified as efficient during early growth maintained superior feed conversion ratios during later fattening stages, while inefficient animals consistently exhibited higher dry matter intake per unit of weight gain. Quantitatively, efficient animals required approximately 10–15% less dry matter intake per kilogram of average daily gain

(ADG), corresponding to differences of 0.8–1.2 kg DM per kg of live weight gain. Energy balance analyses indicated that inefficient beef cattle expended an additional 15–25 MJ of metabolizable energy per day on maintenance-related processes, including basal metabolism and physical activity. These differences accumulated over the finishing period, resulting in substantially higher total feed costs per animal.

From a scientific perspective, these findings provided strong evidence that feed efficiency in beef cattle is an intrinsic biological trait rather than a transient response to diet composition. This work supports early-life phenotyping as a valid strategy for identifying efficient animals prior to major feed investment.

For beef producers, early identification of efficient animals reduces financial risk, improves feed allocation strategies, and enhances predictability of production outcomes. At the national level, improving beef feed efficiency contributes to reduced feed imports and improved sustainability of meat production systems. . Businesses use measures of efficiency to establish benchmarks and goals for production and finance, which may result in decisions that increase productivity without increasing costs of production. There are measures of efficiency that can be used to optimize biological productivity and/or economical profitability in beef production enterprises. One of these is feed efficiency.

Applications of feed efficiency warrant consideration in the beef industry because 55 to 75% of the total costs associated with beef cattle production are feed costs. For instance, a 5% improvement in feed efficiency could have an economic impact four times greater than a 5% increase in average daily weight gain. In addition, feedlot studies have demonstrated that a 10% improvement in average daily gain (ADG) improved profitability by 18%; whereas a 10% improvement in feed efficiency returned a 43% increase in profits. Thus, efforts aimed at improving the efficiency of feed/forage use will have a large impact on reducing input costs associated with beef production. The research studies based on our projects that investigated the influence of diet and Age on ranking of growing calves according to their feed efficiency indicates that feed efficiency depends neither on the diet consumed by the animal nor on its age. This constitutes significant input for the beef industries, because it makes the selection of domestic ruminants for greater efficiency more practical and enables selection at an early stage of life.

3.4 Artificial Light at Night (ALAN): Identifying a Hidden Production Constraint

Another major scientific contribution of my work is the identification of artificial light at night (ALAN) as a previously unrecognized production stressor in ruminant systems. I have investigated the effect of modern artificial illumination on performance, feed efficiency and physiological and metabolic mechanisms in dairy and beef cattle and also in dairy goats and sheep. Our results indicate that ALAN affects production and feed efficiency negatively by increasing energy expenditure and elevating the animals' maintenance cost. These innovative results support the claim that ALAN might be defined as "light pollution" not only in urban areas but also in rural agricultural environments. Such chronobiological insights into modern ruminant production also offer prospects of improving the efficiency of food intake and production in the livestock industry. Moreover, the controlled experiments demonstrated that exposure to short-wavelength LED lighting suppresses nocturnal melatonin secretion, disrupts circadian regulation, and increases maintenance energy expenditure. Animals exposed to ALAN required 5–10% more dry matter intake for the same level of production and exhibited reduced feed efficiency. Mechanistically, ALAN altered hormonal profiles, increased metabolic inefficiency, and elevated energy dissipation as heat.

For farmers, mitigation of ALAN represents a zero-cost intervention that improves feed efficiency and animal welfare. At national and international levels, this work highlights light management as a novel sustainability lever in livestock production. My research regarding illumination effect on ruminants extended individual feed efficiency and chronobiological concepts to dairy goats and fattening lambs. Experimental results demonstrated 15–25% differences in feed efficiency among animals with similar production levels. Inappropriate lighting regimes further exacerbated inefficiency, increasing feed intake without proportional gains in milk or meat. These findings challenge traditional group-average management approaches. For farmers, aligning feeding and lighting management with physiological regulation improves efficiency and resilience. At the national level, improved efficiency in small ruminant systems supports rural livelihoods and sustainable use of marginal lands

3.5 Quinoa as a new and sustainable forage Crop

My research constitutes the first systematic evaluation of quinoa as a forage crop for ruminants. During the past 7 years, I have conducted a number of field trials aimed at examining the potential of quinoa as a new forage crop by using the whole plant (hay, silage, straw) because of its resistant to abiotic stresses such as cold, drought, or saline soils and also Quinoa has high yields and high protein content and minerals and has very good digestibility in ruminants. Quinoa forage was shown that quinoa grown as forage is highly productive (12,700 kg·ha-1) with limited inputs, contains 16–22% crude protein, moderate fiber concentrations, and high digestibility, with dry matter digestibility values exceeding 65–70% under Israeli growing conditions.

The individual feeding trials that I have conducted demonstrated that replacing conventional forages with quinoa forage maintained or improved milk yield in dairy cows, supported efficient growth in beef cattle and enhanced rumen microbial efficiencies and reduced ruminal CH_4 production by 42%. The results also show enhanced feed efficiency in sheep and goats. In several trials, feed conversion improved by approximately 5–10% relative to traditional forage sources. The results show that quinoa may be a highly profitable new forage crop, with high nutritional value and low maintenance cost. This could answer major current needs of farmers. For farmers, quinoa forage offers a drought-tolerant, climate-resilient alternative to imported protein sources. At the national level, adoption of quinoa forage supports diversification of cropping systems, reduces dependency on wheat, and enhances agricultural resilience under climate change scenarios. We are highly confident that our knowledge of establishing and growing quinoa as an economical livestock forage will increase, which will result in greater industry use and greater net profit potential of both farmers and livestock producers. We also predict that our collaborative work will further assist the livestock industry in addressing the growing consumer demand to implement efficient, non-destructive crop and livestock practices, while concurrently enhancing the quality of milk and meat products.

3.6. Environmental-Oriented Grazing and Herd Management: Integrating Precision Livestock Farming and Agroecological Approaches

Another major scientific contribution of my work is to development of precision livestock farming tools integrating sensor-based monitoring, physiological indicators, and adaptive management for managing the beef cattle herd in pasture. The increasing global demand for animal products, together with growing public concern for animal welfare, shrinking availability of arable land, and the urgent need to reduce environmental footprints, requires a fundamental transformation of grazing-based livestock systems. In this context, environmentally oriented grazing and herd management must simultaneously improve production efficiency, animal welfare, and ecosystem services, while reduce greenhouse gas emissions and enhance soil carbon sequestration and nutrient cycling.

This project that I am conducting is integrating advanced Precision Livestock Farming (PLF) technologies with agroecological grazing management to support sustainable intensification of grazing systems. By combining digital monitoring tools with environmentally informed management practices, the project aims to optimize the interface between cattle herds and pasture resources, enabling better alignment between animal energy requirements, forage availability, and ecosystem functioning. In grazing-based beef production systems, pasture is the primary energy source, and management decisions regarding stocking density, grazing duration, and spatial herd movement largely determine animal performance and resource use efficiency. Continuous monitoring of grazing behavior, spatial distribution of animals, and daily activity patterns provides real-time indicators of herd nutritional status, health, reproductive events, and energy balance. Such information allows early detection of stress, disease, forage shortage, or climatic extremes, enabling proactive and adaptive management decisions.

The project employs innovative digital technologies, including wearable collars, drones, and satellite-based remote sensing. Collars continuously collect behavioral and location data over 24 hours, while drones and multispectral satellite imagery (e.g., Copernicus NDVI) are used to assess pasture biomass, forage availability, and vegetation dynamics. We aim to integrate these data streams into a Decision Support System (DSS) designed to assist farmers in real-time decisions regarding herd movement, grazing rotation, and stocking rates—core principles of holistic planned grazing.

The integration of digitalization with agroecological grazing management offers a powerful tool for improving animal welfare and productivity while reducing reliance on external feed inputs. Improved grazing efficiency directly lowers feed costs, the major expense in livestock production, and contributes to reduced methane emissions through improved feed efficiency. Moreover, better-controlled grazing pressure supports biodiversity conservation, soil health, and long-term sustainability of grazing landscapes.

A key innovation of this project is the ability to generate a continuous, large-scale, and real-time “snapshot” of both herd state and pasture condition. This approach enables early identification of distressed animals, reduces mortality risk, improves herd performance, and supports environmentally responsible land management. By demonstrating the benefits of environmentally oriented, data-driven grazing management, the project will provide farmers with practical tools for improving profitability, animal welfare, and ecosystem services, while contributing to national and international goals for sustainable livestock production. For farmers, precision decision support improves management under uncertainty and enhances long-term sustainability. At the national level, these tools support efficient land use and sustainable livestock production systems.

3.7 Establishment of the first Individual Feed Intake platform in a Commercial Israeli Dairy farm

The establishment of the first individual feed intake monitoring platform in a commercial dairy farm in Israel represents a major scientific, technological, and managerial breakthrough in the translation of feed efficiency research into real-world farming conditions. This platform was established at the North Golan dairy farm, a large commercial operation comprising approximately 1,300 lactating Holstein cows and constitutes the first successful implementation of such a system outside experimental research stations in Israel.

Until this initiative, individual feed intake systems were used almost exclusively in academic and research institutions due to their high cost, technical complexity, and lack of demonstrated commercial value under routine farm conditions. The establishment of this platform required scientific vision, personal initiative, and sustained determination to overcome technological, logistical, and geopolitical barriers, and to demonstrate that individual feed intake monitoring can deliver economic and environmental benefits in a commercial dairy setting.

The platform was established within the framework of the ICT-AGRI-FOOD 2022 joint call supported by the Israel Innovation Authority and European partners, with the explicit objective of developing a practical, farm-level system for improving individual feed efficiency. Following project approval, extensive preparatory work was conducted to adapt an existing commercial barn to the specific requirements of individual feeding infrastructure, including structural modifications, construction of a dedicated experimental pen, electrical and communication installations, and full integration with the farm’s routine management systems.

A major challenge emerged following the outbreak of the “Iron Swords” war in October 2023, which resulted in prolonged delays in system shipment and the refusal of the Norwegian manufacturer (Biocontrol, Norway) to send technical staff to Israel for system installation due to security concerns. To prevent project suspension and failure to meet contractual milestones, an alternative strategy was initiated. My research team underwent intensive hands-on training at the manufacturer’s facilities in Norway. This training included software operation, system calibration and validation, pneumatic and electrical assembly, and direct installation of feeding units, as well as site visits to operational farms using the system. This proactive and unconventional approach enabled full independent installation and commissioning of the system upon its arrival in Israel.

Following shipment and delivery, the system was installed and integrated on-site by the research team in close cooperation with the farm staff. The final configuration included 20 individual feeding stations connected to a centralized control and data acquisition system, allowing continuous recording of individual dry matter intake and detailed feeding behavior. After a structured adaptation period, lactating cows were introduced into the system, enabling high-resolution, daily measurements of feed intake under routine commercial conditions.

Initial analyses demonstrated substantial between-cow variability in feed intake, with differences of 3–5 kg dry matter per day among cows producing similar amounts of milk. These differences correspond to energy gaps of approximately 35–60 MJ per cow per day, confirming that large and economically meaningful variation in feed efficiency exists even in intensively managed commercial herds. This finding provided the first direct evidence that individual feed efficiency phenotypes observed in controlled research environments are equally expressed under real farm conditions. As part of the first project year, a core dataset was established by selecting the most efficient and least efficient cows, forming the basis for a longitudinal efficiency database and subsequent evaluation of efficiency repeatability over time and across physiological stages.

Beyond its scientific value, this platform delivers direct and immediate applications for farmers. It provides a decision-support tool for identifying inefficient cows, optimizing culling and replacement strategies, validating nutritional interventions, and improving lifetime feed efficiency. Importantly, selection for improved RFI is expected to indirectly reduce greenhouse gas emissions per unit of milk produced, as numerous studies have demonstrated that low-RFI cows emit less methane per unit of production compared to inefficient counterparts. At the sectoral and national levels, the successful establishment of this platform demonstrates the feasibility and value of deploying precision livestock farming technologies in commercial dairy systems. It establishes a scalable model for future adoption in Israeli dairies and positions Israel at the forefront of applied feed efficiency and sustainability research. Internationally, this initiative contributes a unique case study demonstrating how advanced monitoring technologies can be implemented under challenging conditions to support economically viable and environmentally responsible dairy production.

3.8 Integrated Contribution to national and international Agriculture

Collectively, the research achievements presented in this chapter reflect a coherent and leadership-driven research program that integrates fundamental science, applied innovation, and real-world implementation in ruminant agriculture. A defining feature of this work is the consistent identification of critical bottlenecks in livestock production systems, followed by the development of practical, scalable solutions that bridge the gap between research environments and commercial farming.

At the scientific level, this research established feed efficiency as a stable, biologically grounded individual trait rather than a herd-average characteristic. By systematically quantifying energy partitioning, maintenance requirements, and behavioral components across species, physiological stages, diets, seasons, and photoperiods, this work advanced feed efficiency from a descriptive performance index to a mechanistic physiological framework. This conceptual shift underpins all subsequent applications developed within the research program.

At the applied level, I led the translation of these concepts into precision-based management tools under full commercial conditions. The establishment of Israel's first individual feed intake monitoring platform in a large commercial dairy farm represents a national breakthrough. This initiative demonstrate tangible value for farmers, enables individual-based decision-making related to feed efficiency, culling strategies, nutritional interventions, and long-term selection, while simultaneously supporting environmental mitigation through reduced feed use and greenhouse gas emissions per unit of production .In parallel, I introduced novel sustainability dimensions into livestock management through the identification of artificial light at night (ALAN) as a previously overlooked production stressor. By linking chronobiological disruption to increased maintenance energy expenditure and reduced efficiency, this work positioned light management as a zero-cost intervention with immediate benefits for productivity, animal welfare, and sustainability. The extension of these findings across cattle, sheep, and goats further demonstrates the breadth and transferability of this research agenda .The development of quinoa as a novel forage crop constitutes an additional strategic contribution by combining agronomic experimentation with animal performance trials. This work provided farmers with a climate-resilient, nutritionally valuable alternative to conventional forages, supporting diversification of cropping systems and reducing dependency on imported feed resources under climate change conditions .Beyond individual technologies or discoveries, a central contribution of this work lies in the integration of physiological knowledge, precision livestock farming, and agroecological management into unified decision-support frameworks. These approaches enhance profitability, improve animal welfare, reduce environmental footprints, and strengthen the resilience of livestock systems operating under increasing climatic and economic uncertainty.

At the national level, these contributions support food security, reduce reliance on imported feed inputs, and promote sustainable intensification of Israeli livestock agriculture. At the international level, the research aligns with global priorities in climate-smart agriculture and sustainable livestock production, providing transferable models for integrating advanced science with commercial farming realities.

In summary, this research program is characterized by scientific originality, applied leadership, and measurable impact. By establishing new biological principles, creating national-scale research infrastructure, and delivering practical solutions adopted under commercial conditions, this work contributes meaningfully to the advancement of sustainable livestock production in Israel and internationally.