

Supplementary

Table 1. Population parameters of the studies evaluated. Shown are the descriptions or values provided by the original authors of the articles these studies were chosen from.

First Author (year); Country	Housing System	Production Stage	Experiment Length	Number of Animals (n)	Cattle Sex (cattle age)	Cattle Breed	Significant Results
Housing systems							
Andrighetto (1999); Italy [20]	Crates; Pens	Veal	102 days	34	Bull calves (<1 year)	Holstein	Yes
Blumetto (2017); Uruguay [19]	Pasture; Feedlot	Fattening	133 days	48	Steer (<1 year)	Holstein	Yes
Braghieri (2011); Italy [17]	Pasture; Feedlot	Fattening	6 months	12	Bull (<1 year)	Podolian	Yes
Ferrante (1999); Italy [16]	Crates; Pens	Veal	Not provided	24	Bull calves (<1 year)	Holstein	Yes
Johnson (2011); USA [18]	Hoop barn; Feedlot	Fattening	20 months	960	Steer (not provided)	Crossbred steers; predominantly Angus	Yes
Tuomisto (2008); Finland [13]	Pasture; barn	Fattening	11 months	20	Bull (<1 year)	Hereford	Yes
Tuomisto (2015); Finland [15]	Pasture; feedlot	Fattening	62 days	29	Bull (1–2 years)	Hereford	Yes
Starvaggi Cucuzza (2014); Italy [21]	Feedlot	Fattening	Not provided	12	Bull (<1 year)	Piemontese	Yes
Space allowance							
Fisher (1997); Ireland [25]	Feedlot	Fattening	104 days	32	Heifer (not provided)	Charolais, Simmental and Hereford crossbred	Yes
Fisher (1997); Ireland [26]	Feedlot	Fattening	140 days	96	Heifer (not provided)	Simmental cross	Yes
Hickey (2003); Ireland [23]	Feedlot	Fattening	97 days	75	Steer (not provided)	Holstein	Yes
Keane (2017); Ireland [27]	Feedlot	Fattening	105 days	240	Heifer (1–2 years)	Crossbred	Yes
Keane (2018); Ireland [24]	Pasture; Feedlot	Fattening	105 days	120	Steer (1–2 years)	Charolais crossbred; Limousin crossbred	Yes
Ruis-Heutineck (2000); Netherlands [22]	Feedlot	Fattening	11 months	192	Bull (<1 year)	Piemontese x Black and White crossbred	Yes
Flooring							
Brcsic (2015); Italy [38]	Feedlot	Fattening	9 months	326	Bull (not provided)	Charolais; Limousin	Yes
Brcsic (2015); Italy [45]	Feedlot	Fattening	1 month	1440	Bull (not provided)	Charolais and French crossbred	Yes

	Feedlot	Fattening	4 months	1800	Bull (not provided)	Charolais and French crossbred	Yes
Cozzi (2005); Italy [46]	Feedlot	Fattening	7 months	1,338	Bull (not provided)	Charolais	Yes
Cozzi (2013); Italy [47]	Feedlot	Fattening	7 months	48	Bull (1–2 years)	Charolais and Aubrac crossbred	Yes
Earley (2015); Ireland [48]	Feedlot	Fattening	105 days	240	Heifer (1–2 years)	Continental cross; Holstein	Yes
Earley (2017); Ireland [49]	Feedlot	Fattening	7 months	360	Steer (not provided)	Continental crossbred	Yes
Elmore (2005); USA [41]	Feedlot	Fattening	3 months	48	Steer (<1 year)	Angus cross	Yes
Hickey (2003); Ireland [23]	Feedlot	Fattening	97 days	75	Steer (not provided)	Holstein	No
Keane (2015); Ireland [40]	Feedlot	Fattening	148 days	72	Bull (not provided)	Simmental crossbred	Yes
Keane (2017); Ireland [27]	Feedlot	Fattening	105 days	240	Heifer (1–2 years)	Crossbred	Yes
Platz (2007); Germany [39]	Feedlot	Fattening	1 year	18	Bull (<1 year)	Holstein and Fleckvieh crossbred	Yes
Ruis-Heutineck (2000); Netherlands [22]	Feedlot	Fattening	11 months	192	Bull (<1 year)	Piemontese x Black and White crossbred	Yes
Tessitore (2009); Italy [50]	Feedlot	Fattening	15 months	2,700	Bull (<1 year)	Charolais and French crossbred	Yes
Lowe (2001); Ireland [42]	Feedlot	Fattening	140 days	60	Steer (not provided)	Continental cross	Yes
	Feedlot	Fattening	142 days	80	Steer (not provided)	Continental cross	Yes
Yang (2017); South Korea [51]	Open barn	Fattening	6 months	12	Steer; Heifer (<1 year)	Hanwoo	Yes
Shade							
Blaine (2011); South Africa [28]	Feedlot	Fattening	36 days	146	Bull; Steer (<1 year)	Bonsmara crossbred	Yes
Bond (1975); USA [12]	Feedlot	Fattening	86 days	112	Bull (not provided)	Red Poll; Brown Swiss; Simmental and Hereford crossbred; Simmental and Angus crossbred; Limousin and Hereford crossbred; Limousin and Angus crossbred	No

	Feedlot	Fattening	84 days	120	Bull (not provided)	Simmental and Hereford crossbred; Simmental and Angus crossbred; Limousin and Hereford crossbred; Limousin and Angus crossbred	No
Brown-Bandl (2005); USA [32]	Feedlot	Fattening	37 days	8	Steer (not provided)	Crossbred (¼ Angus, ¼ Hereford; ¼ Pinzsauer; ¼ Red Poll)	Yes
Gaughan (2010); Australia [29]	Feedlot	Fattening	120 days	164	Steer (1–2 years)	Angus	Yes
Hagenmaier (2016); USA [30]	Feedlot	Fattening	1 month	1,395	Steer; Heifer (not provided)	Not provided; predominate ly black hided	Yes
Mitlöchner (2002); USA [31]	Feedlot	Fattening	121 days	168	Heifer (not provided)	Angus crossbred; Charolais crossbred	Yes
Van Iaer (2015); Belgium [14]	Pasture	Cow-calf	2 years	30	Cow (Ranged from 2 to 7 years)	Belgian Blue	No
Miscellaneous features							
Khongdee (2016); Thailand [36]	Barn	Fattening	157 days	10	Heifer (2–3 years)	Hindu Brazil- Brahman crosses	Yes
Magrin (2017); Italy [33]	Feedlot	Fattening	98 days	69	Bull (not provided)	Charolais	Yes
Ninomiya (2009); Japan [34]	Feedlot	Fattening	65 days	20	Steer (<1 year)	Japanese black; Japanese Shorthorn	Yes
Wilson (2002); USA [35]	Feedlot	Fattening	22 days	30	Heifer (1–2 years)	Charolais cross	Yes

Duration	-	>DL, FSRM, OP, PSRM ⁷ and PRM; <SRMPC	-	-	-	-	<EVA and DUR	-	{50} i, {38} h, {39} i, {49} h, {47} i, {41} i, Italy, Germany, Ireland, USA {22} i,
Frequency	-	<FSRM and S	<S	-	-	-	-	-	Netherlands {48} i, {27} i, {49} h, Ireland
Proportion Mounting	-	<ICE and S	-	-	>DL, EVA, FSC, OP and DUR	>DL	-	-	{45} h, {50} i, {38} h, {48} i, {47} i, Italy, Ireland {48} i, Ireland
Duration	-	<DL, FSRM, EasyFix and PRM	-	-	-	-	-	-	{45} h, {50} i, {38} h, {48} i, {47} i, Italy, Ireland {48} i, Ireland
Proportion	-	-	-	-	-	>DL and EasyFix	-	-	{41} i, USA
Postural changes Resting	-	<FSRM	>SRMPC	-	-	-	-	-	{38} h, Italy
Proportion Standing	-	>FSRM	-	-	-	-	-	-	{50} i, Italy
Duration	-	<DL	-	-	-	-	-	-	{38} h, Italy
Unsuccessful lying event Frequency	-	>FSRM	-	-	-	-	-	-	{38} h, Italy
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Productivity									
Average daily gain	-	<FSRM, PRM and S	-	-	-	-	-	-	{38} h, {40} h, {47} i, {27} i, Italy, Ireland {49} h, Ireland
Dry matter intake	-	<OP	-	-	<OP	-	>EVA and DUR	-	{40} h, {27} i, Ireland
Feed conversion ratio	-	< FSRM and S	-	-	-	-	-	-	{38, 27, 22, 51} i, South Korea {49} h, {40} h, {22} i, Ireland, Netherlands
Final live weight	-	<FSRM, PRM and S	>S	-	-	-	-	>RH	
Live weight gain	-	<EVA, FSRM, OP and DUR	>S	-	<EVA, OP and DUR	-	>EVA and DUR	-	
<hr/>									
Product quality									
Carcass gain	-	<FSRM	-	-	-	-	-	-	{40} h, Ireland {27} i, Ireland
Carcass weight	-	<S	-	-	-	-	-	-	{40} h, {27} i, Ireland
Hide weight	-	<FSRM and S	-	-	-	-	-	-	{40} h, Ireland
Kidney and channel fat weights	-	<FSRM	-	-	-	-	-	-	{40} h, Ireland
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Physiology									
Total serum protein	-	>S	-	-	-	-	-	-	{27} i, Ireland
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Health									
Bursitis prevalence	-	>DL and FSRM	-	-	-	-	-	-	{45} h, {38} h, Italy

Early culling (%)	-	>DL	-	-	-	-	-	-	{45} ^h , Italy
Gait scores	-	>FSRM	<SRMPC	-	-	-	-	-	{32} ⁱ , USA
Hairless patch prevalence	-	>DL	-	-	-	-	-	-	{45} ^h , Italy
Hock swelling scores	-	>FSRM	<SRMPC	-	-	-	-	-	{41} ⁱ , USA
Hoof erosion	-	<ICE	-	-	>DL and FSC	>DL	-	-	{48} ⁱ , Ireland
Hoof lesion prevalence	-	<DL, EVA, FSRM, EasyFix, DUR and ICE	>S	-	-	-	-	-	{48} ⁱ , {49} ^h , {40} ^h , Ireland
Hoof overgrowth prevalence	-	<FSRM, EasyFix and ICE	-	-	>DL	-	-	-	{38} ^h , {48} ⁱ , Italy, Ireland
Hygiene score	>PSF and S	<DL, OP and SRMPC; >ICE	<SRMPC; >S	>S and SS ⁸	<OP	<DL; >EasyFix	>EVA and DUR	-	{46} ^h , {42} ^h , {48} ⁱ , {49} ^h , {41} ⁱ , Italy, Ireland, USA
Knee swelling	-	>FSRM	<SRMPC	-	-	-	-	-	{41} ⁱ , USA
Lesions / swelling prevalence	-	>DL, FSRM and PSRM; <SRMPC	<SRMPC	-	-	-	-	-	{45} ^h , {39} ⁱ , {41} ⁱ , Italy, Germany, USA
Nasal discharge prevalence	-	<DL	-	-	-	-	-	-	{45} ^h , Italy
Pen cleanliness	-	Cleaner than FSRM and SRMPC	Cleaner than SRMPC	-	-	-	-	-	{41} ⁱ , USA
Severe lesions prevalence	-	>FSRM	<S	-	-	-	-	-	{22} ⁱ , Netherlands
Slipping events	-	>PC and PRM	-	-	-	-	-	-	{47} ^g , Italy
Treatments for locomotor disorders	-	-	-	-	-	-	-	-	-
Proportion	-	> FSRM	-	-	-	-	-	-	{38} ^h , Italy

¹ Deep litter; ² Rice husks; ³ Wood shavings; ⁴ Foam structure rubber mat; ⁵ Rubber mat (Durapak); ⁶ Solid rubber mat—partial cover; ⁷ Partially slatted rubber mats; ⁸ Strips of rubber secured to slats; ^h Age not provided; ⁱ <1 year; ^j 1–2 years.

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