http://Guidelines.BeefImprovement.org

BIF Guidelines for Uniform Beef Improvement Programs Wiki

B. L. Golden, Managing Partner, Theta Solutions, LLC

Topics

- Development and rollout of the Wiki
- How it works
- Content
- Who's using it and how
- How you can contribute

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Welcome to the Wiki version of the Beef Improvement Federation Guidelines for Uniform Beef Improvement Programs. The Guidelines is provided to aid producers in selecting and improving beef cattle. The Guidelines is divided into three principal sections: Data Collection and Processing, Genetic Evaluation, and Selection and Marketing. In addition, there are sections about the Beef Improvement Federation and a Useful Pages section that contains an invaluable Essential Reading list for those interested in delving deeper into all things related to beef cattle breeding.

As life-long breeders of beef seedstock, we find these guidelines to be critical to the success of our own operations, our breed associations, and our industry as a whole. Failure to accurately quantify and efficaciously improve our beef cattle will result in financial and well-being losses for ranching families and consumers across the globe.

As with all such efforts, the current contributors to this effort stand on the shoulders of industry greats who date back well over six decades. It would be impossible to thank all of those who have come before us, but to them we owe a debt of gratitude. On behalf of myself, the BIF Board of Directors, and the long line of contributors to these Guidelines, we hope that you find them useful, if not essential, to achieving your selection goals.

- Lee Leachman, BIF President 2018

Guidelines is a publication of the Beef Improvement Federation.

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In the beginning…

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Decision – Making Hierarchy

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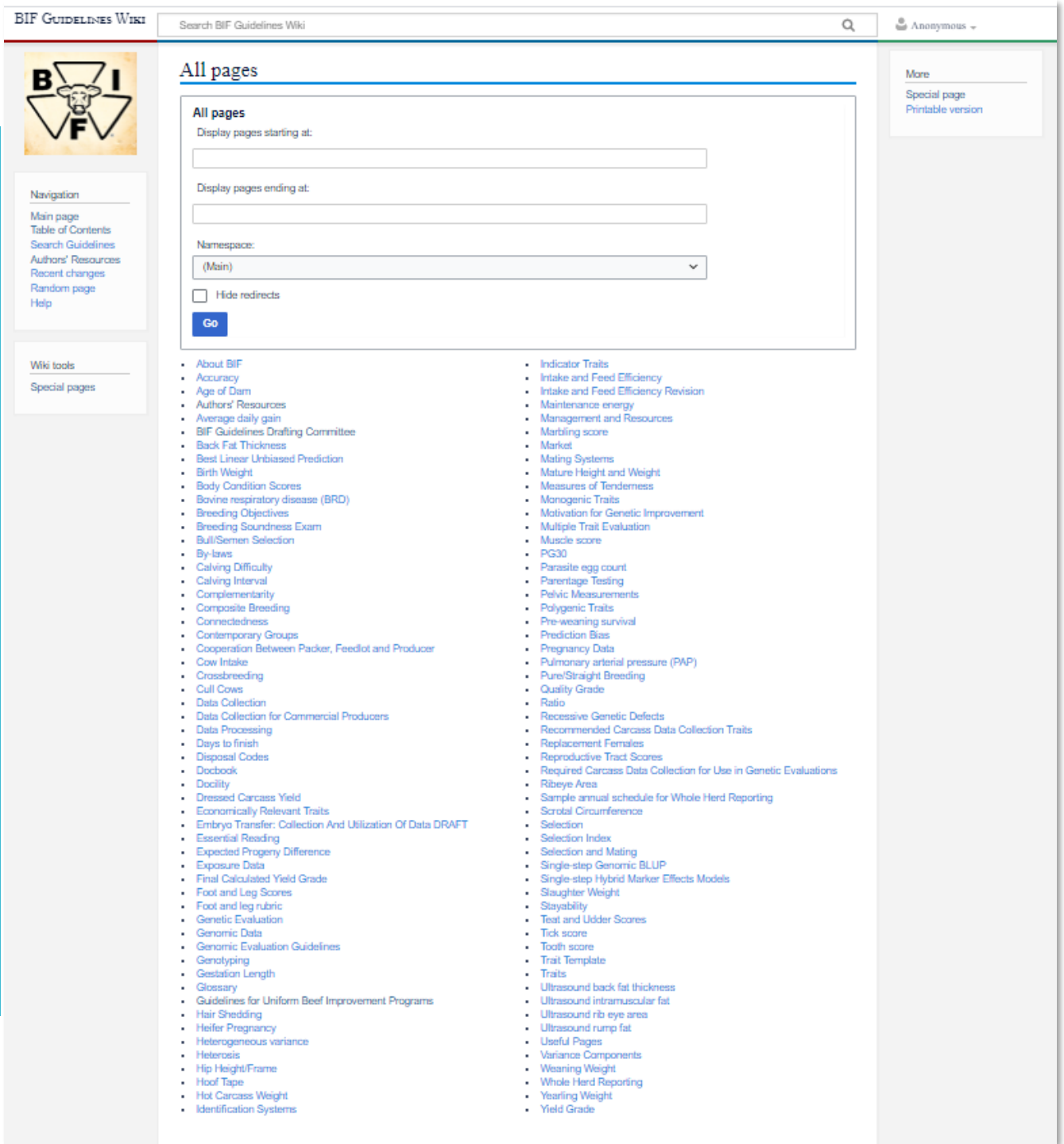

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Whole Herd Reporting

Historically, many beef breed genetic evaluations were based on progeny weaned and/or registered and did not require that data be recorded from females that failed to reproduce, or whose progeny were not registered. By contrast, inventory-based Whole Herd Reporting (WHR) requires the collection and reporting on an annual basis, the production of every cow and performance of every calf raised through weaning. A Sample annual schedule for Whole Herd Reporting is provided as an example how a WHR program may function.

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Purpose

Collecting records on the production of every female allows for the calculation of unbiased reproductive genetic predictions, such as heifer pregnancy and Stayability. Collecting weaning weights on the whole calf crop allows for the calculation of unbiased genetic predictions for growth through weaning, as well as the ability to account for selection for post-weaning traits. The importance of the latter cannot be overstated. Note birth weights are not required as it is not reasonable for producers managing cattle in extensive conditions to collect a birth weight on every calf in the first 24 hours.

While it is the objective of WHR to accumulate reproductive and performance data on all animals in a breed, the purpose of WHR is not to control which animals will be registered. That remains a decision of individual breeders. With WHR, performance records (or disposal codes) are required on all calves produced by each breeder, but whether any or all of those calves receive registration papers is the breeder's decision.

The following procedures and definitions are recommended for an efficient and effective inventory-based Whole Herd Reporting system.

Heifer exposure inventory

To collect reproductive data on potential replacement heifers, a yearling heifer exposure inventory must be produced. This is different than yearling weight reporting, and associations should not assume that all heifers that report a yearling weight will be exposed. The heifer exposure inventory would typically be requested in May for spring-born heifers and in November for fall-born heifers. On the inventory, producers should indicate breeding season start and end dates, individual exposure status, management group, and disposal information. Differences among management groups in post-yearling feeding, management, or mating practices should be recorded.

Designating breeding season length is for use in genetic prediction models, which generally do not use data from an open-ended breeding season (e.g., >90 days). Mating practices include putting heifers into different management groups, which are pasture bred in different breeding pastures. Heifers that are artificially inseminated in the same management group, but put into different cleanup pastures do not need to be designated separately.

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Stayability

Stayability is generally defined as the probability of surviving to a specific age, given the opportunity to reach that age. Adapted to beef cows, the general definition of stayability is the probability of a cow surviving to her cost-breakeven age, given the opportunity to reach that age. Cows usually need five consecutive calves by six years of age to generate enough income to pay their development and maintenance costs, so the age of six years was established as the target age for stayability. Without records of which females were retained for breeding and every calf they raised, cows with at least one calf before age six years were considered to have opportunity, and successful cows had a calf at age six years or older. Annual production records required by whole-herd reporting systems enable more rigorous definitions of stayability. Calving first as a two-year-old can indicate opportunity, and a calf every year through age six years may be required for success.

A version of stayability, called sustained cow fertility, is provided by the American Hereford Association. It is calculated as a cow's ability to stay in the herd producing calves through 12 years.

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Phenotype

Observations of stayability are binary, either success (1) or failure (0). An observation should be assigned to all females who are old enough and are considered to have had an opportunity to succeed. Missing values should be assigned to females who are too young or otherwise did not have an opportunity to succeed. That may include cows culled for reasons other than reproductive failure, breeding females sold before the target age, and females used as donors or recipients in embryo transfer and in vitro fertilization programs.

Adjusted Value

There is no adjustment to the binary (0,1) stayability observations.

Contempory Group

Contemporary groups for stayability should include all females entering the breeding herd with the same opportunity to stay. Basic information used to form stayability contemporary groups is heifers' weaning contemporary group, and contemporary group of their first calves, when they calved as two-year-olds.

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genotype

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Genomic Data

...dels | single-step hybrid marker effects models]] for genetic prediction. **Genotype** data can also be used for [[Parentage Testing| parentage testing]].
736 bytes (95 words) - 11:52, 17 December 2019

Genotyping

...ested to the testing lab. Because all cells contain DNA, it is possible to **genotype** many different tissue types; however, laboratories may differ in their pref
1 KB (234 words) - 12:18, 17 December 2019

Parentage Testing

...one parent, while the '"a"' came from the other). Therefore, an animal's **genotype** at many loci can be compared to genotypes of potential parents at those sam
3 KB (444 words) - 14:53, 18 January 2020

Selection Index

indexes. Genetics 8:476–490.</ref>. He first defined the concept of aggregate **genotype** (H), or breeding objective in terms of the "...net genetic improvement wh ...ction criterion I will maximize the response in the aggregate **genotype** or breeding objective (H). This can be achieved by estimating
7 KB (1,126 words) - 15:27, 18 January 2020

Recessive Genetic Defects

| Nonlethal (influenced by PHA **genotype**)
4 KB (538 words) - 15:11, 18 January 2020

Expected Progeny Difference

...s temporary environmental effects, and GxE represents interactions between **genotype** and environment<ref name="Bourdon"/><ref>Pierce, BA. 2016. Genetics Essent
7 KB (994 words) - 04:49, 17 December 2019

Glossary

...dominant to the allele allowing growth of horns (p), so an animal with the **genotype** Pp will have the polled form of the trait. ; **Genotype**
53 KB (8,038 words) - 05:16, 4 December 2019

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Genotyping

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Genotyping refers to the process of using laboratory methods to determine which alleles an individual animal carries, usually at one particular gene or "locus" in the genome. The genotype identifies which alleles an animal carries. Producers must send in samples containing DNA from animals to be tested to the testing lab. Because all cells contain DNA, it is possible to genotype many different tissue types; however, laboratories may differ in their preferred sample type. Typical samples include blood vials or cards, semen, and tail hair samples. It is important that tail hair samples include the roots – ideally 30-50 hairs with intact roots. Below are links to videos on sampling DNA from cattle using different methods.

If you are sampling DNA from a deceased animal, call the testing laboratory to determine the best protocol. It is important to get a good quality sample to ensure the DNA test will be able to generate results. The cost of testing varies depending upon the company and how many tests are performed but ranges from $10-40/test; with an average of ~$25/test. Irrespective of carrier animals in its pedigree, an animal that has been tested and found to be a non-carrier did not inherit the mutant allele and will not transmit the genetic defect to its progeny.

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Tail hair

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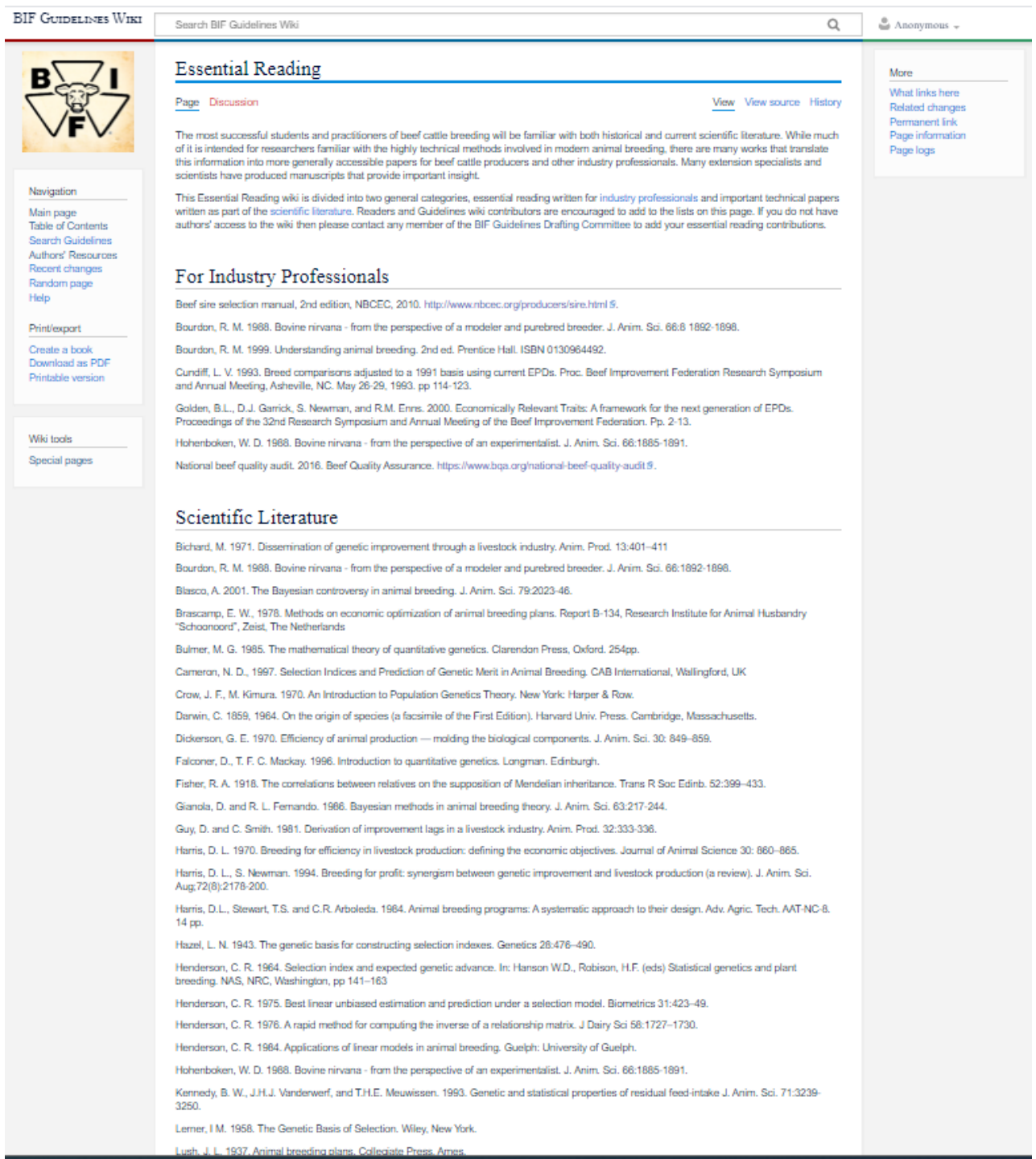
	Shear force
	Ultrasound back fat thickness
	Ultrasound intramuscular fat
	Ultrasound rib eye area
	Ultrasound rump fat
	Yield grade

Several new features



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The most successful students and practitioners of beef cattle breeding will be familiar with both historical and current scientific literature. While much of it is intended for researchers familiar with the highly technical methods involved in modern animal breeding, there are many works that translate this information into more generally accessible papers for beef cattle producers and other industry professionals. Many extension specialists and scientists have produced manuscripts that provide important insight.

This Essential Reading wiki is divided into two general categories, essential reading written for industry professionals and important technical papers written as part of the scientific literature. Readers and Guidelines wiki contributors are encouraged to add to the lists on this page. If you do not have authors' access to the wiki then please contact any member of the BIF Guidelines Drafting Committee to add your essential reading contributions.

For Industry Professionals

Beef sire selection manual, 2nd edition, NBCEC, 2010. http://www.nbcec.org/producers/sire.html

Bourdon, R. M. 1988. Bovine nirvana - from the perspective of a modeler and purebred breeder. J. Anim. Sci. 66:8 1892-1898.

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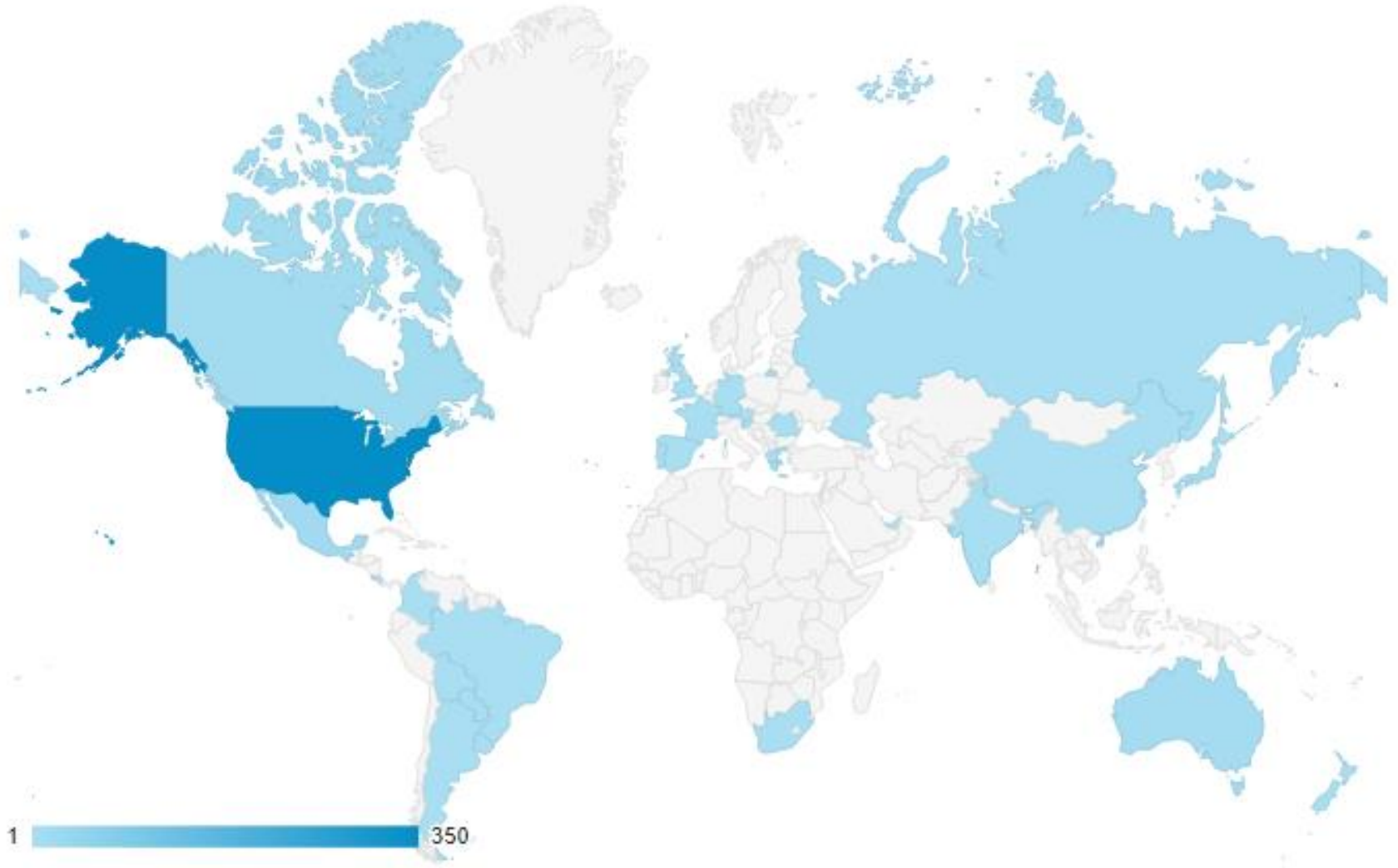
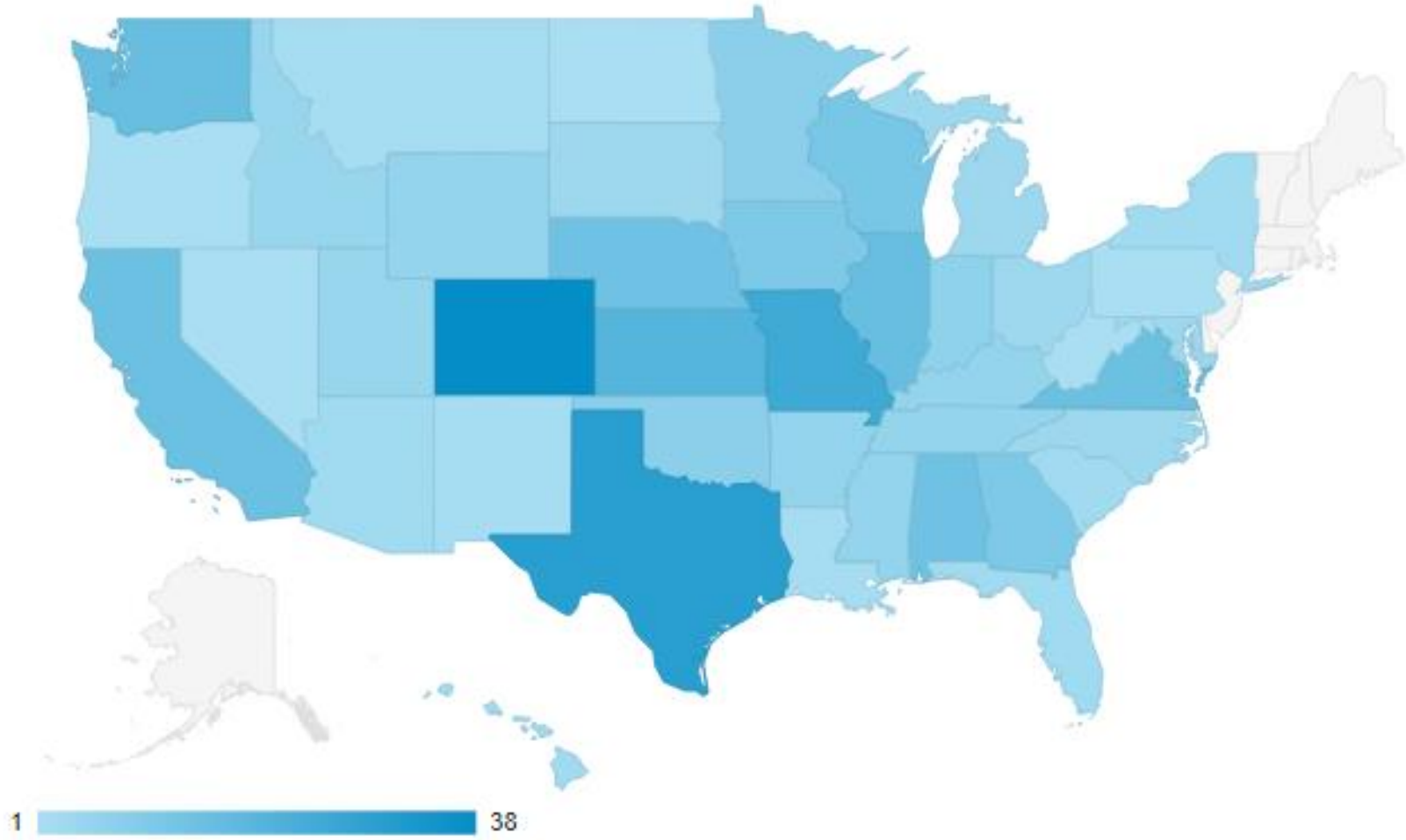
Who's using it so far?



May 26, 2020 to June 6, 2020

Who's using it so far?



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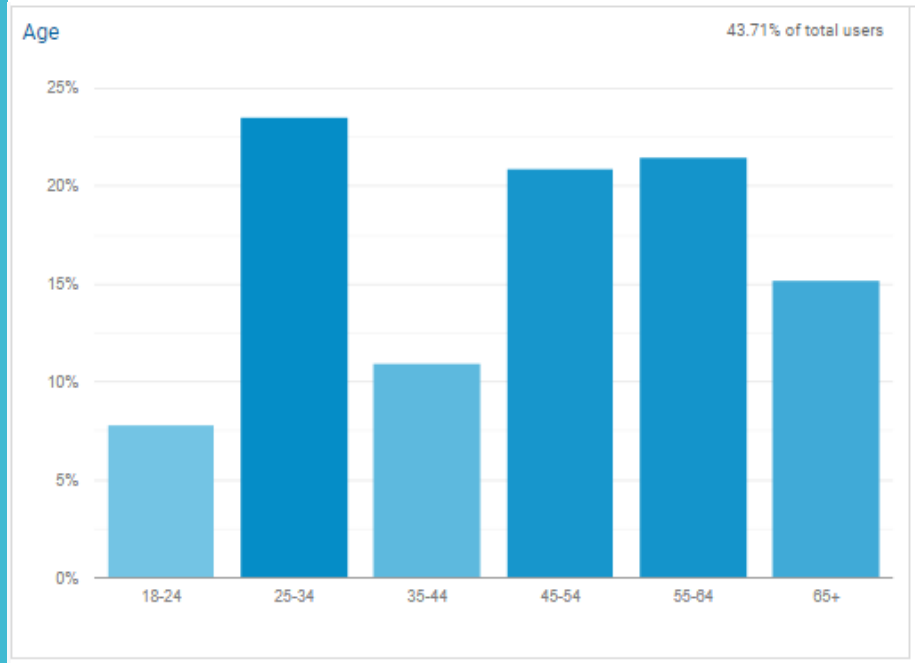
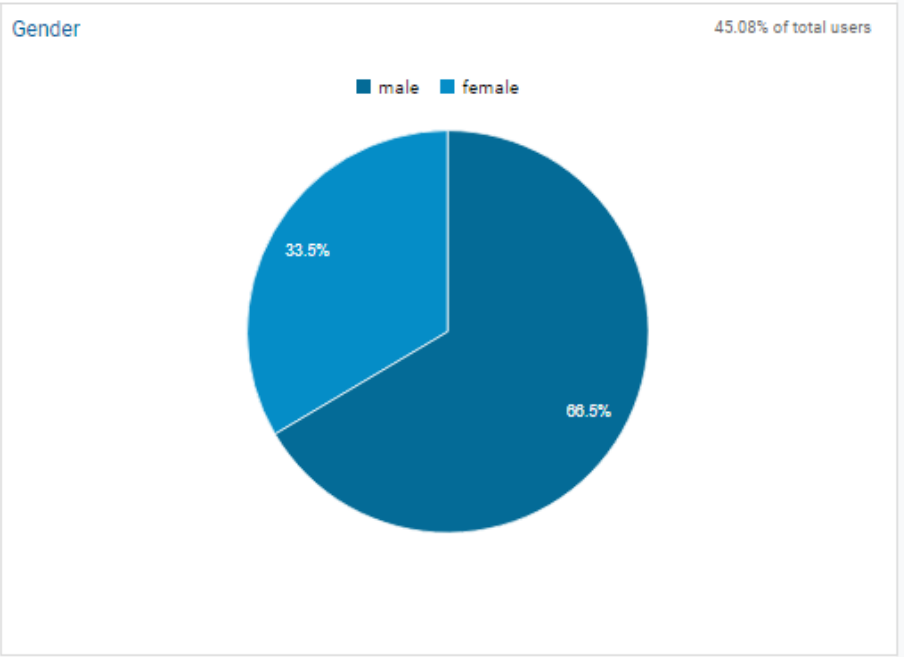
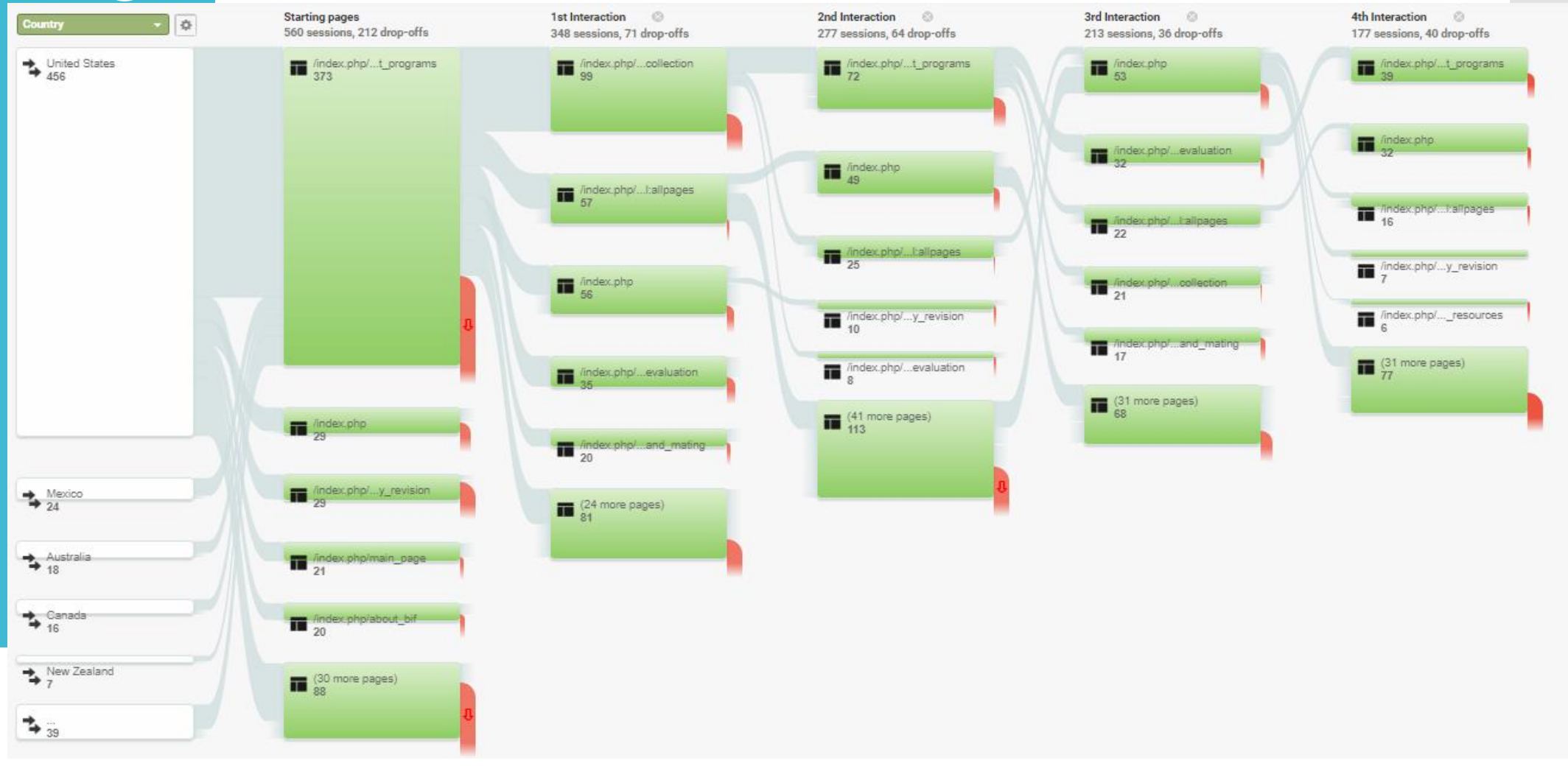
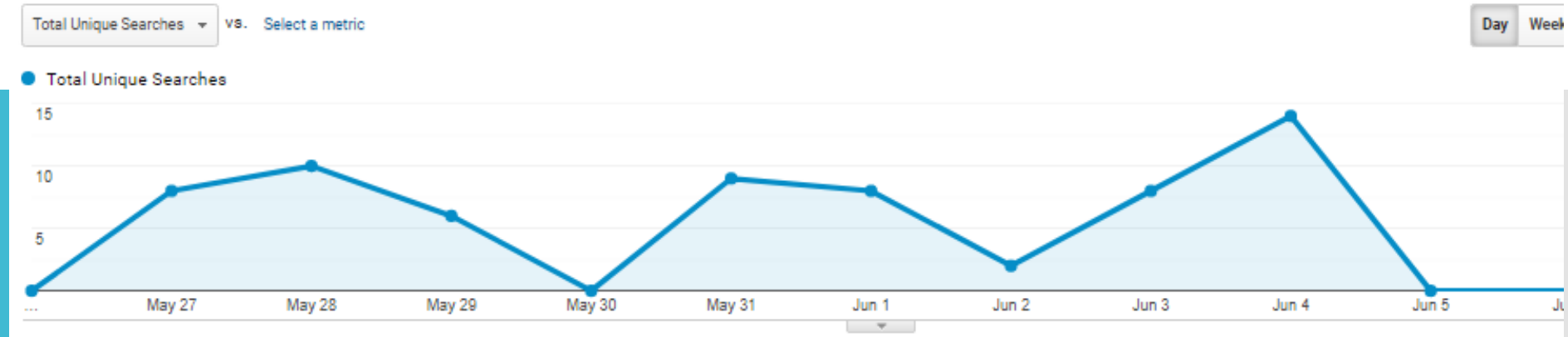




How is it being used?



How is it being used?

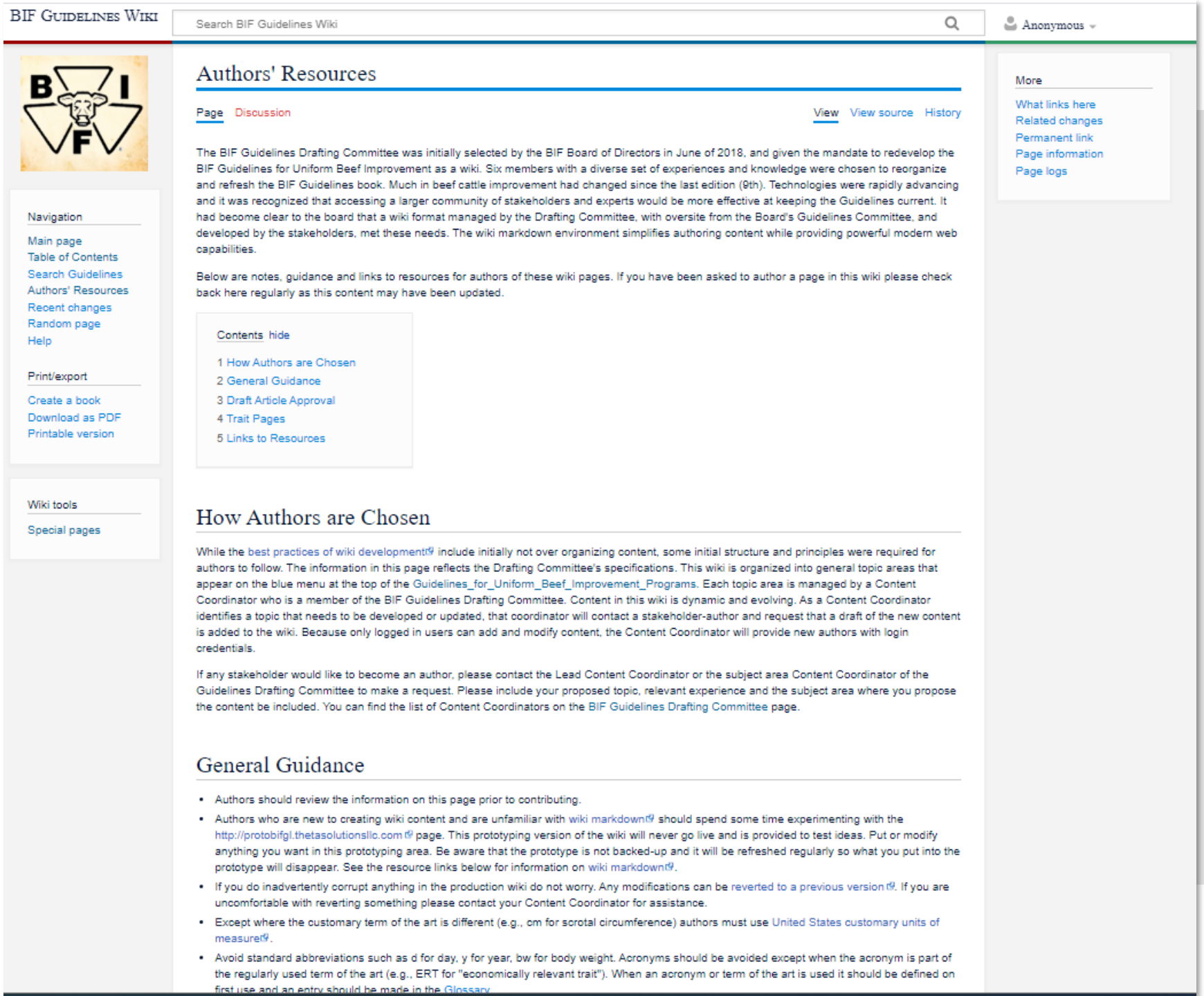


Primary Dimension: Search Term Site Search Category

Secondary dimension | Sort Type: Default | advanced

Search Term	Total Unique Searches	Results Pageviews / Search	% Search Exits	% Search Refinements	Time after Search
	65 % of Total: 100.00% (65)	1.22 Avg for View: 1.22 (0.00%)	4.62% Avg for View: 4.62% (0.00%)	29.11% Avg for View: 29.11% (0.00%)	00:05:00 Avg for View: 00:05:00 (0.00%)
1. 205 day adjusted weaning weight	11 (16.92%)	1.18	9.09%	0.00%	00:02:39
2. adjusted weaning weight	4 (6.15%)	1.25	0.00%	40.00%	00:01:44
3. NAAB	3 (4.62%)	1.00	0.00%	66.67%	00:06:14
4. RFI	3 (4.62%)	1.00	0.00%	33.33%	00:06:21
5. annual meeting	2 (3.08%)	1.00	50.00%	0.00%	00:03:47
6. arnett	2 (3.08%)	1.00	0.00%	50.00%	00:01:00
7. 205	1 (1.54%)	1.00	0.00%	0.00%	00:00:08
8. 205 adjusted day weaning weight	1 (1.54%)	1.00	0.00%	0.00%	00:02:14
9. 205 adjusted weaning weight	1 (1.54%)	1.00	0.00%	100.00%	00:54:25
10. 205 adjustmed weaning weight	1 (1.54%)	1.00	0.00%	100.00%	00:00:12

How can you contribute?



BIF Guidelines Wiki

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The BIF Guidelines Drafting Committee was initially selected by the BIF Board of Directors in June of 2018, and given the mandate to redevelop the BIF Guidelines for Uniform Beef Improvement as a wiki. Six members with a diverse set of experiences and knowledge were chosen to reorganize and refresh the BIF Guidelines book. Much in beef cattle improvement had changed since the last edition (9th). Technologies were rapidly advancing and it was recognized that accessing a larger community of stakeholders and experts would be more effective at keeping the Guidelines current. It had become clear to the board that a wiki format managed by the Drafting Committee, with oversite from the Board's Guidelines Committee, and developed by the stakeholders, met these needs. The wiki markdown environment simplifies authoring content while providing powerful modern web capabilities.

Below are notes, guidance and links to resources for authors of these wiki pages. If you have been asked to author a page in this wiki please check back here regularly as this content may have been updated.

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1 How Authors are Chosen
2 General Guidance
3 Draft Article Approval
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How Authors are Chosen

While the best practices of wiki development include initially not over organizing content, some initial structure and principles were required for authors to follow. The information in this page reflects the Drafting Committee's specifications. This wiki is organized into general topic areas that appear on the blue menu at the top of the Guidelines_for_Uniform_Beef_Improvement_Programs. Each topic area is managed by a Content Coordinator who is a member of the BIF Guidelines Drafting Committee. Content in this wiki is dynamic and evolving. As a Content Coordinator identifies a topic that needs to be developed or updated, that coordinator will contact a stakeholder-author and request that a draft of the new content is added to the wiki. Because only logged in users can add and modify content, the Content Coordinator will provide new authors with login credentials.

If any stakeholder would like to become an author, please contact the Lead Content Coordinator or the subject area Content Coordinator of the Guidelines Drafting Committee to make a request. Please include your proposed topic, relevant experience and the subject area where you propose the content be included. You can find the list of Content Coordinators on the BIF Guidelines Drafting Committee page.

General Guidance

- Authors should review the information on this page prior to contributing.
- Authors who are new to creating wiki content and are unfamiliar with wiki markdown should spend some time experimenting with the http://protobifgl.thetasolutionsllc.com page. This prototyping version of the wiki will never go live and is provided to test ideas. Put or modify anything you want in this prototyping area. Be aware that the prototype is not backed-up and it will be refreshed regularly so what you put into the prototype will disappear. See the resource links below for information on wiki markdown.
- If you do inadvertently corrupt anything in the production wiki do not worry. Any modifications can be reverted to a previous version. If you are uncomfortable with reverting something please contact your Content Coordinator for assistance.
- Except where the customary term of the art is different (e.g., cm for scrotal circumference) authors must use United States customary units of measure.
- Avoid standard abbreviations such as d for day, y for year, bw for body weight. Acronyms should be avoided except when the acronym is part of the regularly used term of the art (e.g., ERT for "economically relevant trait"). When an acronym or term of the art is used it should be defined on first use and an entry should be made in the Glossary.

Contact any member of the Drafting Committee

BIF Guidelines Drafting Committee

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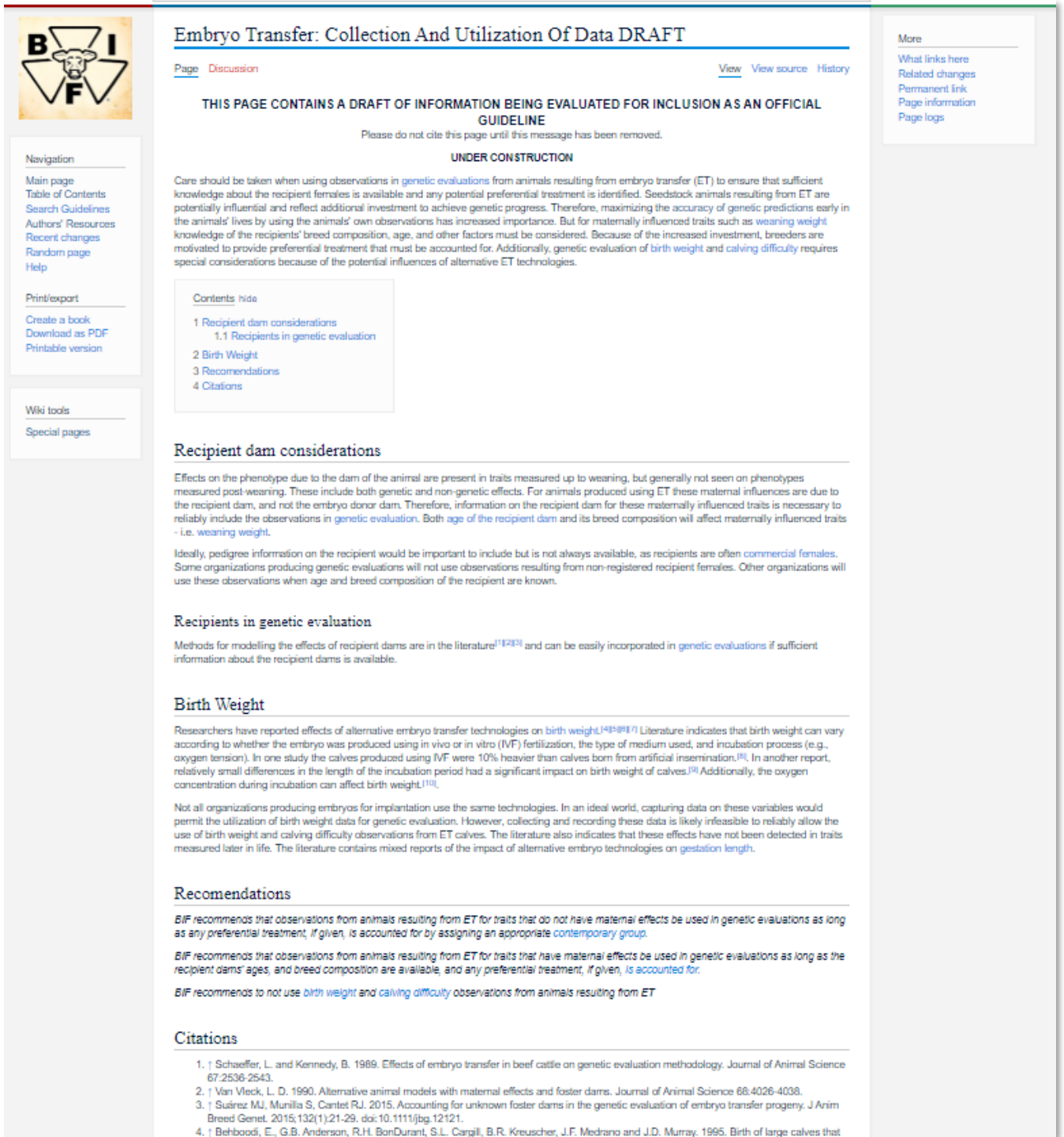
The BIF Guidelines Drafting Committee is responsible for organizing, editing and recruiting authors of content.

Content Area	Content (Co) Coordinators
About BIF	Warren Snelling
Data Collection and Processing	Megan Rolf Bruce L. Golden
Genetic Evaluation	Warren M. Snelling Matt L. Spangler
Selection and Mating	Darrh K. Bullock Matt L. Spangler
Technical Coordinator	Bruce L. Golden
Editor	Merlyn Nielsen

Controversial or extensive new work will go through an approval process

Example new content in development



Embryo Transfer: Collection And Utilization Of Data DRAFT

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UNDER CONSTRUCTION

Care should be taken when using observations in genetic evaluations from animals resulting from embryo transfer (ET) to ensure that sufficient knowledge about the recipient females is available and any potential preferential treatment is identified. Seedstock animals resulting from ET are potentially influential and reflect additional investment to achieve genetic progress. Therefore, maximizing the accuracy of genetic predictions early in the animals' lives by using the animals' own observations has increased importance. But for maternally influenced traits such as weaning weight knowledge of the recipients' breed composition, age, and other factors must be considered. Because of the increased investment, breeders are motivated to provide preferential treatment that must be accounted for. Additionally, genetic evaluation of birth weight and calving difficulty requires special considerations because of the potential influences of alternative ET technologies.

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Recipient dam considerations

Effects on the phenotype due to the dam of the animal are present in traits measured up to weaning, but generally not seen on phenotypes measured post-weaning. These include both genetic and non-genetic effects. For animals produced using ET these maternal influences are due to the recipient dam, and not the embryo donor dam. Therefore, information on the recipient dam for these maternally influenced traits is necessary to reliably include the observations in genetic evaluation. Both age of the recipient dam and its breed composition will affect maternally influenced traits - i.e. weaning weight.

Ideally, pedigree information on the recipient would be important to include but is not always available, as recipients are often commercial females. Some organizations producing genetic evaluations will not use observations resulting from non-registered recipient females. Other organizations will use these observations when age and breed composition of the recipient are known.

Recipients in genetic evaluation

Methods for modelling the effects of recipient dams are in the literature[1][2][3] and can be easily incorporated in genetic evaluations if sufficient information about the recipient dams is available.

Birth Weight

Researchers have reported effects of alternative embryo transfer technologies on birth weight.[4][5][6][7] Literature indicates that birth weight can vary according to whether the embryo was produced using in vivo or in vitro (IVF) fertilization, the type of medium used, and incubation process (e.g., oxygen tension). In one study the calves produced using IVF were 10% heavier than calves born from artificial insemination.[8] In another report, relatively small differences in the length of the incubation period had a significant impact on birth weight of calves.[9] Additionally, the oxygen concentration during incubation can affect birth weight.[10]

Not all organizations producing embryos for implantation use the same technologies. In an ideal world, capturing data on these variables would permit the utilization of birth weight data for genetic evaluation. However, collecting and recording these data is likely infeasible to reliably allow the use of birth weight and calving difficulty observations from ET calves. The literature also indicates that these effects have not been detected in traits measured later in life. The literature contains mixed reports of the impact of alternative embryo technologies on gestation length.

Recomendations

BIF recommends that observations from animals resulting from ET for traits that do not have maternal effects be used in genetic evaluations as long as any preferential treatment, if given, is accounted for by assigning an appropriate contemporary group.

BIF recommends that observations from animals resulting from ET for traits that have maternal effects be used in genetic evaluations as long as the recipient dams' ages, and breed composition are available, and any preferential treatment, if given, is accounted for.

BIF recommends to not use birth weight and calving difficulty observations from animals resulting from ET

Citations

1. ↑ Schaeffer, L. and Kennedy, B. 1989. Effects of embryo transfer in beef cattle on genetic evaluation methodology. Journal of Animal Science 67:2536-2543.
2. ↑ Van Vleck, L. D. 1990. Alternative animal models with maternal effects and foster dams. Journal of Animal Science 68:4026-4038.
3. ↑ Suárez MJ, Munilla S, Cantet RJ. 2015. Accounting for unknown foster dams in the genetic evaluation of embryo transfer progeny. J Anim Breed Genet. 2015;132(1):21-29. doi:10.1111/jbg.12121.
4. ↑ Behboodi, E., G.B. Anderson, R.H. BonDurant, S.L. Cargill, B.R. Kreuscher, J.F. Medrano and J.D. Murray. 1995. Birth of large calves that

http://Guidelines.BeefImprovement.org

Questions?