Reality-check on replacement heifer availability for the organic herds under proposed regulations

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Assuming the following metrics for a given herd of cows:

- An organic herd size (nationally) of 200,000 milking cows (HS)
- A a 33% cull rate (CR) for that herd (33% of the animals will need to be replaced annually)
- An 18% death loss in calves Non Completion Rate of heifers (NCR)
- A Calving Interval (CI) of 13.6 months
- Average age at first calving (AFC) 23 months
- Calf Sex Ratio (SR) of 53.3% females (JDS Volume 90, Issue 3 March 2007, Pages 1255–1264)

- **Number of replacement heifers needed**: utilizing the formula for internal herd growth as outlined in Penn State Extension publication (Penn State, Nov. 2012) one can calculate how many heifers are needed:

  - Knowing how many replacements you need annually to achieve your dairy's goals (maintain herd size, expand, or downsize) is a key starting point to managing heifer inventories. This number is easy to calculate with a few key herd metrics: herd size (HS; milking and dry cows), average age at first calving (AFC), herd cull rate (CR), and the non-completion rate of heifers (NCR; heifers that enter the replacement growing business but do not enter the dairy herd).
  - $Replacement\ Heifers\ \mathbf{needed} = Herdsize * \frac{AFC}{24} * \frac{CR}{100} * (1 + \frac{NCR}{100})$

- **Number of replacement heifers expected**: utilizing the formula as outlined in Penn State Extension publication (Penn State, Nov. 2012) one can calculate how many heifers are expected:

  - Another key to heifer inventory is identifying how many heifers you can expect annually. To do this, herd size (HS), calving interval (CI), calf sex ratio (SR), calf mortality rate (CM), and age at first calving (AFC) are needed. The formula includes the time period (1 year for comparison) as well.
  - $Replacement\ Heifers\ \mathbf{expected} = 1 * Herdsize * \frac{12}{CI} * \frac{SR}{100} * 1 - CM * \frac{24}{AFC}$

Discussion:
Given these metrics, the difference between the number of heifers expected and needed is +5,847: in other words the supply pipeline of heifers available for replacements would widen and an extra almost 6,000 heifers would be available and could be sold to expanding herds. The problem with these metrics is that I don't believe these metrics are real and feasible:

- The 33% CR for organic herds is not even reality for conventional herds. The CR is likely to be over 40%,
- Speaking with organic producers, the feasibility of an 18% Non Completion Rate is seriously doubted,
- A Calving Interval of 13.6 months is likely in organic herds not very feasible: it is probably in reality 14+ months,
- Average age at first calving (AFC) at 23 would be good for conventional herds but given slower growth rates on pasture this number is likely to be at least 25-28 months.

Scenarios:

- By just adjusting the AFC from 23 to 25 months, the heifer supply evaporates from almost +6,000 to -7,082
- By adjusting the CI to 14 months, that shortage grows to -9,197 heifers,
- By changing the CR from 33% to 40%, the shortage of available heifers would grow to -26,406 heifers, or 13% of the total organic herd size.

Prediction:
Given the herd metrics likely to be the reality for organic producers, it is predictable that within one year of not allowing conventional heifers to be converted to organic heifers, and only depending on "organically raised" heifers, that there would be a serious shortage of organic replacement heifers in the marketplace. These predictions are based on changing herd metrics from an "unrealistic scenario" to a "more-realistic scenario". Only in the "unrealistic scenario" the organic herd size would be able to keep up with replacement heifer needs. Even if producers were to reduce their cull rates as a result of the tightening heifer supply (which they would be forced to, in order to maintain herd size): they would have to reduce their cull rates to 29.2% to maintain the current organic herd size. This reduction in CR would have a definitely negative effect on the organic milk supply, because producers would be holding on to less productive cows that should have been culled to maintain herd health, reproductive health, and milk quality. If we take a even darker scenario (14.6 months CI, 28 months AFC): organic producers would have to reduce their cull rates even further to 22.4% to maintain herd size! These cull rates and subsequent effects on herd health, reproduction and milk quality would seriously jeopardize the sustainability of the organic dairy sector.