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# Where have all the Dragons gone?

by Jackie Pearcey; First printed in *Logres Weyr Clear Skies #21*; reprinted by author's permission

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One of the uncomfortable thoughts, reading the Pern books is: exactly how high is the casualty rate in Threadfall?

The death of any dragon in the books is upsetting to an entire Weyr, yet the replacement rate indicates that this is a very common event.

A Northern Weyr during Threadfall in the ninth Pass seemed to operate with between 300 and 500 fighting dragons. Earlier passes seemed to require more dragons, but the dragons were considerably smaller than eighth and ninth Pass dragons and presumably early Weyrleaders swapped whole Wings in and out of Fall in order not to overtire the smaller dragons. However, in the ninth Pass, dragons seemed to fight the entire Fall as a normal practice. With the traditional 6 day margin, that's between about 60 to 70 Falls a year, if a dragon fights them all.

Yet, each Weyr has up to 5 queens, which rise twice a Turn each during the early part of the Pass (and probably right up until quite close to the end of the Pass). From the books, it's clear that 12 is considered a terribly puny clutch, and even Orloth's 26 wasn't considered numerically impressive, and though Ramoth never laid less than 20 and often more like 40, she was considered unusually prolific. So, it's likely that an average clutch of 20 would be a very conservative estimate of numbers Hatched.

That means, with 10 Hatchings a year, at least 200 new dragons Hatched. Or, to put it another way, a Weyr replacement rate of 50% of the fighting population a year!

Yet, the Weyr senior management seems remarkably stable with Weyrleaders hardly ever killed by Fall in the books and Weyrleaders upset at major scorings during a Fall, let alone mass casualties.

So where have the surplus dragons gone?

In the ninth Pass, some of the extras were colonizing the South. This was probably more possible during the ninth Pass than it would have been in earlier ones because the sheer size of the modern dragons meant that less were needed to fight a Fall, so the Weyr had an in-built surplus. However the Southern Weyr didn't take that many and were soon breeding new dragons for themselves!

The key must lie in the casualty rates.

Of a Weyr population of 400 dragons, there must be between 100 and 150 recuperating from injuries major and minor at any time. When a Weyr is full, there's no need for riders with minor injuries to fight, especially if that injury would increase the risk. Injured riders and dragons would be kept out of Fall, unless a Weyr was very short of fighters. Minor grazes such as wingtip injuries would be painful and could get infected and aggravated *between* and would

probably not be risked in Fall. Major injuries could remove a pair from Fall for a Turn or more. Many major injuries would permanently impair a fighting pair and then other roles would have to be sought for them. To some extent, those who could still fly safely would be ideal as watchriders (as would the older pairs. Early retirement would probably be the norm during a Pass), though there would be a limit as to how many Holds and coholds could actually keep a dragon and his or her rider! As casualties mount during a Pass, a Weyrleader could actually end up begging minor Holders to take a Watchrider.

However even this casualty rate doesn't account for the missing dragons. The gap must be filled by dragons dying.

During an Interval, as outlined in *Masterharper*, dragons and riders can live very long lives. Casualty rates in training seem small and a queen rising about once every 5 Turns or so is sufficient to replace the dragon population.

That's a replacement rate of about 6 dragons a Turn, which is indicative of a pretty low dragon death rate. Clearly, during an Interval most Weyrlings survive their training, otherwise Benden would never have survived alone. During such an Interval, Weyrling training seems to last for several Turns, with new riders being given considerable attention and training before being integrated into the Wings.

Yet, during a Pass, Weyrlings end up in the fighting Wings facing Thread in less than 2 Turns. Often, when the rider is still very young. An analogy springs to mind of World War One fighter pilots who were trained very rapidly, who had an average lifespan in battle of less than an hour, often dying from their own mistakes made due to the hasty nature of their training as much as from enemy action. Rapidly trained Weyrlings run a much higher risk of oversteering young dragon wings, permanently injuring the dragon, failing to survive being trained to go *between* (a risky activity at the best of times) and dying quickly when faced with Thread.

Yet, if a Weyr is risking such high casualty rates by rushing training, there must be a good reason. Even during a Pass, a Weyr can't afford to carry too many passengers.

They simply don't have the capacity to have too many Wings standing by in case of a particularly bad Fall injuring or killing an unusually large number of dragons. Weyrlings are needed to become full riders quickly to fill up the gaps.

The price paid for that must be a Weyrling casualty rate of nearly 50% during training, most of which probably happens when Weyrlings start flying sacks of firestone to fighting dragons during a Fall. That's very much a test of weyrling abilities. Dragons too young to flame, flying through clumps of deadly Thread to drop firestone sacks to fighters right up where the Thread is falling hardest. Riders who can survive that and their first few Falls probably have what it takes to survive many fights, a bit like soldiers in the trenches in the First World War, who had a very high chance indeed of dying in their first week, but if they survived that would have a better than average chance of surviving six months or more at the front.

A Weyrling death rate of 50% tends to then lead to a replacement rate of about 1/4 of a Weyr a Turn, which tallies with the actual severe injury rate that F'lar's Wings sustained the first Fall. Each dragon inexperienced with Thread, yet all dragons and riders mature and hence well aware of their partners' abilities and limitations.

Yet, if dragons dying upsets the Weyr so much, how come the dragons aren't so distressed by a Weyrling death rate of 50% or more? It must be that the death of an immature dragon simply isn't as distressing to mature dragons as the death of an older dragon is. Dragons (and their riders) during a Pass know that most Weyrlings aren't going to make it to become comrades in their fighting Wings, so their deaths, while sad, aren't the same at all as the loss of good friends who have been through a lot of dangerous experiences with each other. The death of a Weyrling is probably marked with a usual draconic tribute, but quickly forgotten. Dragons seem to have little memory and their riders have probably learned not to get too attached to young riders until it's clear whether or not they're going to live to join the fighting Wings.

So what about the rest of the casualties? Clearly a lot of mature pairs die too. However, Weyrleaders and Wingleaders seem to live charmed lives.

Fighting Thread is clearly an exercise in tactics. In modern warfare, few senior officers are actually right there slugging it out with a rifle. They're pretty close (too close in some cases, normally ending up in a Victoria Cross) to the action, but have to be in a position to be able to see what's going on. A Weyrleader may well be on the upper levels, flaming away, but if he were too busy fighting for his own life, he'd be unable to decide which Wings to move where in order to react to the shifting patterns of Thread and to keep track of what was going on around him. Similarly, for Wingleaders and 'Seconds. They have roles which, if they get it wrong, could result in massively increased casualties, so must fight from positions which mean that, while they do a fair share of fighting Thread, they have sufficient breathing space to be able to consider other issues. In other words they must be protected to a considerable extent by the Wing formations.

So, the bulk of the severe casualties for mature dragons are sustained by the green and blueriders and, to some extent, by those brown riders who are not in 'Second positions. Senior riders can expect to live many healthy Turns of Fall, provided that they keep their wits about them. The rest can expect to die very young indeed.



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## Where have all the

# Dragons gone? Part 2

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Reading Jackie's article reminded me of a piece I did some years back for Druinne Weyr, concerning casualty figures, and I thought it might be fun to compare the numbers and the reasoning behind them here! This is a revised copy of that article, so apologies if some of you find it somewhat familiar....

Wonderful, isn't it? The thought of sweeping majestically through the skies on a flaming dragon in pursuit of the ancient enemy.... Well, the thought may be wonderful and romantic but the reality most certainly isn't. Let's face it: being an in-Pass dragonrider is quite simply the most dangerous job there is on Pern....

And this fact is not going to be kept from you. The weyrbred know it almost from the moment that they can comprehend what they are seeing, but hold- and craftbred Candidates often have more romantic ideas about the Weys. The Candidates' classes, started up by an assigned Weyrlingmaster as soon as a clutch is laid, serve to show this rough and unpleasant reality just as much as they serve to train the Candidates in the care of young dragons.

So, how dangerous is it? Well, look at the numbers for one thing. An in-Pass Weyr can have up to five fertile queens, each rising and laying twice a Turn, with clutches averaging out at something like 25 eggs each time. As the full fighting complement of a Weyr is approximately 500 dragons, this means that the Weyr's entire fighting force can be replaced every two Turns! Something has to happen to all those extra dragons.

And happen it most certainly does. Let's start with the Weyrling Barracks, in which the dragons spend the first two Turns of their lives. Disease can strike at any time, as can accidents -- to both dragon and rider. Learning to fly can be dangerous, and learning to go *between* can result in the loss of anything up to a quarter of any given clutch -- any mistake almost certainly will be fatal. Then the Weyrlings get their first taste of Thread, flying with the Queens' Wing and acting as firestone suppliers. Again, this is dangerous work for the young and inexperienced and the casualties will be high, especially amongst those who try to show off in Fall, acts of wanton bravado are viewed as a form of evolution in action....

So casualties amongst the Weyrlings run at anything between 25 and 50%. Then the newly qualified young pairs get to join the fighting Wings and the danger really begins.

Threadfall patterns are easily predictable, and a Weyr can probably expect to meet Thread maybe once every week to every week and a half. Each of those Falls lasts six hours (although a Weyr need not pursue it if it goes over the ocean), crossing some four time zones with the leading edge moving at about 120mph. Six hours is a long time to have to concentrate solidly on what you are doing and much of

what happens in Fall can only be learned through experience. Weather patterns, time of day, time of season -- all have a part in how a Fall goes, as does the wind. If there is little wind, then the Thread will simply fall in a predictable manner, but if the winds are high, Thread can blow back into dragons already fighting to keep themselves stable in the air. Then the casualties can be horrendous.

And the casualties are not always blind to a dragon's color. The larger bronzes and browns may be able to take more damage than the greens and blues, but their larger size makes them less agile and so easier to hit. The golds, at least, are relatively protected in their position in the Queens' Wing, but even there they are not completely safe and accidents may happen....

Of those dragons Hatched on a Weyr's sands, maybe only 10 to 20% can expect to be alive and fighting with the Wings some five Tums on. The rest will be dead or sufficiently injured to have been retired from fighting, for not all bad injuries are fatal. The loss of an eye by either rider or dragon will have them removed from the Wings, as will the loss of a limb, and flightless dragons are not unknown. Dragons and for riders with injuries that leave them disabled but flightworthy are often assigned as Hold watchriders or, if they have the right temperament, as Weyrwingmasters.

And just because a pair have managed to survive their first five Tums alive if not unscathed, it does not mean that they are then immune to the ravages of Thread. Foul winds and unexpected moves - or the mistakes of a less experienced pair - may serve to take them out of the Wings. In Threadfall, nobody can ever let themselves become complacent....

Even if you and your dragon are amongst the lucky ones, you will almost certainly have had some experience - maybe slight, maybe severe - with Threadscore. Few indeed are the pairs who do not bear some form of Threadscar, and those who wear them know all too well that they are not the badges of honor that some Weyrlings would have them be, but the everlasting evidence of bad luck and stupid mistakes. Threadscore is a very bad burn - think of it as an injury similar to that which would be left by a writhing, 10-foot long, white-hot poker. And it tends to fall in clumps. The cold of *between* will kill it, but a dragon or rider badly scored and in intense pain will often forget to visualize any destination and be lost in the transference. Those who do make it back to the Weyr will then go into the care of the Weyr's Healers and Dragonhealers, who will do their best to get them treated and flightworthy again. The Infirmary is a target for those Weyrwingmasters with Candidates in tow - after seeing the evidence of Thread-inflicted injuries for themselves, many choose not to stand for Impression after all.

An interesting point that comes out of comparing casualty/clutching figures is the significance of the huge clutches and frequent queen eggs Benden was seen to produce during the Ninth Pass. The Benden Weyrleaders were convinced it was a sign of the innate superiority of

their bloodline, but the truth may be a little less positive than that.

Part of the apparent fecundity of Benden's queens may be put down to Ramoth's intensely jealous behavior and the fact that everybody pandered to it. With only three adult queens in the Weyr during the height of the Pass, the biological urge would have been firmly geared towards producing the other two queens to fill the gap! The Oldtime Weyrs produced fewer queens not because their golds were less capable of laying gold eggs, but because they had no need to do so - they were already queen-full. If Benden had been firmer in its management of its Senior queen, then things would have been different, and the news that Benden was giving away another gold dragon would probably have resulted not in jealousy amongst the other Weyrs, but in amused comments about letting a stropky queen have her own way all the time....

With only three queens laying (and so only 6 clutches per Turn, rather than 10), the Benden clutch sizes would have to be larger than those of other Weyrs, simply to catch up with the numbers - 6 clutches of 40 eggs apiece produce the same number of eggs as 10 clutches of 24, but with much greater strain on the individual queens! It would have been interesting to see the clutch sizes produced by Benden queens transferred to queen-full Weyrs.... All this is largely ignoring the casualty rates, of course, and there Benden would probably have been at something of a disadvantage too, as the greater size of their dragons would have made them far less agile in the air, and all that in-breeding would probably not have done a great deal for their reaction time (let's face it - from a bloodline point of view, the Bendens are effectively the draconic equivalent of the Hapsburgs!).

So, with all this going on, aren't you glad you're in a post-Pass Weyr? The riders we have at Logres are those who have either survived the horrors of Threadfall (although not all made it through unscathed), or who will never have to face it, Impressing too late to meet 'Fall. A few may regret the passing of what some will undoubtedly view as the "glory days" of the Pass, but more will probably be glad to see the back of Thread once and for all. Arguments between the two camps could make for interesting story-fodder.

Our queens will still keep rising and we'll probably end up with an average of around four very small (single figure) clutches per Turn - with few deaths, and a still-active policy encouraging transfers from other Weyrs, there is no need for large numbers of new hatchlings any more. Will there be any Logres-bred queens? Yes, but not just yet - wait and see....

*Kadanzer Note: Since Logres is a post-Pass club, the characters there are lucky; they don't have to deal with these casualty rates anymore. However, we at Kadanzer do. Though there are some differences in the figuring (for instance, Kadanzer's territory is larger so they need to rise*

*to fight more often) they are in general balanced out by other factors (not every dragon rises to meet every 'Fall.) The club management fully agrees with the conclusions expressed here (or else this article wouldn't be in the handbook!) Most of the casualties are considered to take place offstage, with nameless NPCs bearing the brunt of them, but they do happen and everyone needs to be aware of this.*