Illyriad Combat Mechanics

For those who want to get past the “rules of thumb” and “generally accepted” way of fighting in Illyriad and know how it actually works:

Here you will find everything you’ve always wanted to know about fighting in Illy.

**Basic Attack formulae**

For a simple attack of one type of offensive unit against one type of defensive unit it works like this:

Example: 100 charioteers on plains with a 10% bonus from a commander with charge 10 will have:

If the commander has 10 heroism he will have:

1. The commander base attack ( scales down when you have too few troops. The commander base attack can never be more than the total unit base attack (base means without the bonuses)
2. The commander attack always has a minimum of twice his attack, so a charioteer commander will always be at least 74 attack (2x37), even if you send only 1 trooper with him.
3. As you can see from the formula, the commander benefits from terrain and from his own division bonus. Assuming the division bonus applies to his own type of attack of course.

**Basic Defense formula**

I have tested exclusively on NPCs, but Player defense should work similarly.

Defense works as follows:

Of course NPC’s don’t have a division bonus, but players might have. The **specific defense** depends on what type of attacker we have. Pikemen will have better defences against cavalry and thus, a higher total defense score. If there are multiple defenders, you calculate them separately and add them up.

If for example you have:

800 ratlings (6 def vs cavalry) and 500 rats (8 defense vs cavalry) you will get:

**Expanded Defense formula**

It gets complicated when you have multiple types of units on attack. Unit specific defense will, itself be determined by a formula that calculates by ratio of the attackers. The more of a certain type of attacker will be attacking, the more the defense against that type will matter. An example would be when you attack with 100 charioteers and 100 men at arms. Both defense types will become active.

The formula for this is:

You can see for yourself that if you have only 1 attack type, this will simplify to just “defense 1”, since the fraction will calculate to 1 (Total atk type 1 and Total attack will be equal in such a case). Then you will have the basic defense formula again. Calculations such as these are definitely not worth doing by hand. They are too complicated.

**Casualties and damage**

The casualties and commander damage are determined as:

To use the above examples of the charioteers fighting the rats:

Total charioteer attack = 5180 + 3159.8 = 8339.8

Total Rat defense = 7480

Similarly calculated, the commander will receive 89 damage (of course with 100 troops, the casualties are the same as the commander damage. Generally this is not the case.)

**Random factor**

I am able to calculate battles on plains to 100,0% precision, but of course if there were a random factor of 0,1%, I might not detect it. What is the point of a random factor that small though? I find it highly unlikely the developers would put in a factor that eats processing power and ends up doing exactly nothing. In short: There is no random factor, period!

**Terrain Bonuses**

Terrain bonuses seem to be as follows:



These are by no means 100% certain, but I’ve tested hundreds of reports on plains, dozens of reports in forests and some reports on the other terrains. The yellow colors show the modifiers I am unsure of. I will find the rest as soon as my spear town is up and running and I can do some hits.

Keep in mind that these are not estimates. If I find a single report that I can’t explain with 100% accuracy, say: it deviates by 1 commander damage or 1 casualty, I will discard the whole modifier configuration for that terrain.

Some pointers and advice:

1. Oversending (meaning, sending too many troops) is not a good thing, unless you are attacking with small armies (say: 65 troops or less). Oversending can hurt you a lot in terms of casualties. I posted the following on the forum about this. It is mathematically complicated, but no one is forcing you to read it!

If your commander is boosted by heroism you will actually get **more** casualties if you oversend.

Up to 65 troops sent, a 10 heroism commander will have the same casualties no matter how many you send.

If you send over 65 with a 10 heroism commander, then your casualties will increase. If you send 130, while you only need 65, you will be receiving about 33% more casualties than you have to. This is because of the following:

Casualties = Total army size \* (def/off ratio)

1) Casualties are determined by def/off ratio. This would suggest that you should send as many as possible.

2) However, the way the ratio determines casualties is a percentage of total sent troops. So the more you send the more you lose also.

Not counting the commander these effect are equally strong, meaning it doesn't matter how many you send as long as you send enough.

At 65 troops your commander consists of half your total offense (with 10 heroism). That means by his presence, he halves your losses, because he doubles your offense, just counting heroism. If you then double your troop strength the following happens:

-Army size +100%  (times 2)

-Offensive strength +50% (= times 1,5)

2/1,5 = 1,33, thus 33% more losses! Try it with the formula with some numbers and you will agree. People have been known to grossly oversend and do not realize how much it hurts them.

If you use multiple commanders it is even worse. Sending 5 commanders with only 65 troops can reduce your casualties by a factor of 6. If you then decided to send 40k troops instead of 65 troops, you would receive roughly 6 times as many casualties, because the commander offense (from heroism) then amounts to almost nothing percentage-wise.

There is however, one advantage to oversending and that's limiting commander damage as commander damage is calculated as:

Commander damage = 100 \* (def/off ratio)

That means, the more troops the less commander damage. However, commander healing is free, lost troops are not.

1. Experience is divided equally among commanders. That means you can put all your troops with the commander with the highest bonus and the others will still get xp. Yes you can have divisions with no troops, as long as there is 1 troop in the army.
2. The trick of making 5 divisions of a single troop type so the casualties will round down and you lose less... does not work! The game finds your fractional dead troops and adds them up, to turn them into a Frankenstein monster that does not live. Which means it is calculated as if they were all in the same division.
3. The most economic way to level commanders is with small armies doing small hits, but it is not possible to do this effectively with 10 towns making 200 troops per day. You will have to go after bigger fish and will probably have to resort to killing things other than rats and dogs.
4. Don’t bother calculating your hits by hand(calculator). Instead, use an excel calculator like the one I provide. It does everything you need and some more. It is of course, limited to 5 troop types and commanders, but if you do hits with more than 5 different troop types, you would have needed weeks to calculate a single hit anyway...
5. You don’t actually have to calculate every hit. At some point you will develop an affinity for guessing the amount you need. Of course it does pay to calculate very large hits, when oversending can easily cost you hundreds of extra troops.