Combat Effectiveness

Posted by Molotov - 18 Jul 2014 14:09

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as you know, heavy infantry has a strength of 3, and light infantry has a strength of 2. that is, heavy infantry is 50% stronger than light infantry, and 2 heavy infantry units equal 3 light infantry units in the open field. right? wrong. combat rules are a little more complicated. you can read about the actual rules here
(post #11, steps 5-9). below is just the table revealing effective combat strengths:

20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.00	0.47	0.30	0.21	0.16	0.12	0.10	0.08	0.06	0.05	0.04	0.04	0.03	0.02	0.02
2	2.11	1.00	0.63	0.44	0.33	0.26	0.21	0.17	0.14	0.11	0.09	0.07	0.06	0.05	0.04
3	3.35	1.59	1.00	0.71	0.53	0.41	0.33	0.26	0.22	0.18	0.14	0.12	0.10	0.08	0.06
4	4.75	2.25	1.42	1.00	0.75	0.58	0.46	0.38	0.31	0.25	0.20	0.17	0.13	0.11	0.08
5	6.33	3.00	1.89	1.33	1.00	0.78	0.62	0.50	0.41	0.33	0.27	0.22	0.18	0.14	0.11
6	8.14	3.86	2.43	1.71	1.29	1.00	0.80	0.64	0.52	0.43	0.35	0.29	0.23	0.18	0.14
7	10.23	4.85	3.05	2.15	1.62	1.26	1.00	0.81	0.66	0.54	0.44	0.36	0.29	0.23	0.18
8	12.67	6.00	3.78	2.67	2.00	1.56	1.24	1.00	0.81	0.67	0.55	0.44	0.36	0.29	0.22
9	15.55	7.36	4.64	3.27	2.45	1.91	1.52	1.23	1.00	0.82	0.67	0.55	0.44	0.35	0.27
10	19.00	9.00	5.67	4.00	3.00	2.33	1.86	1.50	1.22	1.00	0.82	0.67	0.54	0.43	0.33
11	23.22	11.00	6.93	4.89	3.67	2.85	2.27	1.83	1.49	1.22	1.00	0.81	0.66	0.52	0.41
12	28.50	13.50	8.50	6.00	4.50	3.50	2.79	2.25	1.83	1.50	1.23	1.00	0.81	0.64	0.50
13	35.29	16.71	10.52	7.43	5.57	4.33	3.45	2.79	2.27	1.86	1.52	1.24	1.00	0.80	0.62
14	44.33	21.00	13.22	9.33	7.00	5.44	4.33	3.50	2.85	2.33	1.91	1.56	1.26	1.00	0.78
15	57.00	27.00	17.00	12.00	9.00	7.00	5.57	4.50	3.67	3.00	2.45	2.00	1.62	1.29	1.00

so, as you can see, heavy infatry (str 3, row 3) is 59% stronger than light infantry (str 2, column 2). you can say this difference isnt really noticeable. but take a look at 9 to 6 ratio. a unit of str 9 is really 1.91 times stronger than a unit of str 6, thats almost *two times* stronger! and a unit of str 15 is *9x* times stronger than a unit of str 5, not 3x as you'd expect.

with this table, you can evaluate real strength of different units. e.g., you may be wondering which unit is better, gnomes or barbarians? gnomes have str 3 and 3 hits, while barbs have str 4 and 2 hits. barbs are 1.42 times stronger. but gnomes have more hits, so, having only 0.71 of a barbs strength, gnomes are valued 1.065 more than barbs in combat (0.71*3/2), so they're simply better almost in every aspect: cost, poison immunity, medal chanse, arrow immunity if built in a city with weapon master, woods move bonus etc.

hope this will help you to make a better PGS and estimate strength of your stacks more prescisely!

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Re: Combat Effectiveness

Posted by Dragatus - 30 Aug 2014 20:54

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I was aware the STR scaling wasn't linear and how to calculate the proper ratio, but it never occured me to put it in a table. Thanks, this will come in handy.

For anyone wondering, the reason why it isn't linear is because if both units are succesful nothing happens. So high Strength will both increase the chance that you damage the enemy and reduce the chance that the enemy damages you.

The combat formula in that other forum is slightly off. A unit is successful not only if the die roll is lower than it's Strength but also if it's equal. If it had to be lwoer units with 1 STR would be unable to do any damage.

I would also like to note that the table is for the standard dice size of 20. If you reduce or increase the combat dice size in the setting it will change the ratios. Lower than normal dice size will make high STR more valuable. Higher than normal dice size will make high STR less valuable.

Finally, when comparing units and choosing which ones to pick for your side, it's good to consider not only how they perform in isolation but also how other units you may have, your heroes or simply a city's Fortify bonus will influence a unit's performance.

Low Strength units scale better with combat bonuses than high Strength units. For example, in isolation an Elf Infantry unit (4 STR, 1 HIT) is 19% stronger than a Dwarf Runner (1 STR, 4 HIT), not counting the Dwarfslayer ability. But a +1 bonus from being placed in a village will already increase the combat power of the Elf Infantry by 33% and the combat power of the Dwarf Runner by 111%. So the Dwarf Runner is actually a much better defensive unit even though the Elf Infantry is stronger in a strict comparison.

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Re: Combat Effectiveness
Posted by KGB - 01 Sep 2014 02:55

Dragatus wrote:

For anyone wondering, the reason why it isn't linear is because if both units are succesful nothing happens. So high Strength will both increase the chance that you damage the enemy and reduce the chance that the enemy damages you.

Not quite. The reason it isn't linear is because the combat rolls are bounded by finite numbers (1-20). If the rolls were between -infinity+infinity then it would be linear.

KGB

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Re: Combat Effectiveness
Posted by Dragatus - 01 Sep 2014 12:22

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Actually if rolls were between -infinity and infinity Strength would be irrelevant because all units would have 50% chance to be succesful (negative number rolled) and 50% chance to fail (positive number rolled).

But you are absolutely right that the larger the die size, the more linear the Strength scaling gets.

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