Hitting the rise ball

I recognize that discussions about hitting in female FP softball may be of little interest to BB folks. For what it is worth, I believe that the swing mechanics in Junior Olympic FP should be basically identical to MLB swing mechanics. So the discussion is not totally irrelevant to BBers. And I suspect it is of significant interest to the Fastpitch crowd.

I'm sure those who are similarly involved in FP will share my pain. . .whenever the point is made that FP hitting mechanics should emulate MLB, invariably, the immediate response is "BB players don't have to hit the rise ball." As if that settles the question, and makes a compelling case for hitting off the back foot, swinging down, and pushing at the ball w/ a total arms swing. And I'm not exaggerating – that is the NORMAL swing taught to female FP hitters.

Totally specious, of course. For all of the reasons stated many times in this – and other – forums. And there is growing awareness that traditional perception may well have been wrong. Certainly, the success of the ULL (University of Louisiana) hitters have advanced the cause. Most importantly, Mike Candrea (Olympic Team and Arizona) and Sue Enquist (UCLA) now endorse the RightView Pro product, and state unequivocally that the FP swing should be identical to the MLB swing. Those are two figures venerated in FP circles, and obviously, that is a huge statement and belief change on their part. (The fact that they don't yet understand fully the MLB swing is beyond the scope of this post. They are making progress, and their change of belief is influencing many.)

But still, the rise ball is spoken of in reverential tones, until the mystique of this pitch takes on a life of its own. And any hitting philosophy and instruction geared at female hitters has to take strong account of the rise ball to achieve credibility. And I think that is fair, because it IS an incredibly challenging pitch to hit.

But it doesn't do what people think that it does. And to apply proper rotational mechanics to hitting the pitch, I think it is essential to first understand what the pitch does.

The video clips and pictures following are of Sarah Pauly, Senior Pitcher for Texas A&M, Corpus Christi. Sarah was 4th in Strike Outs in all of D1 last season (11.4 per 7 innings pitched), and has been in the top 5 in D1 in Ks and ERA for each of her first three seasons. She can pitch.

As way of background: I was espousing my opinion about the actual trajectory of the riseball on eTeamZ one day, and was challenged by Rick Pauly, Sarah's father. His reference point was that he wasn't sure rotational technique was the most effective way to handle the rise. (I don't want to speak for Rick, but I believe he has changed his mind

on this.) And I can appreciate his position. I did a web search and learned that Sarah handled the University of Louisiana - Lafayette (a strong rotational hitting team, and at the time, the #7 team in D1) last year in both ends of a double-header, striking out 20+ over the two games. I have no idea how many rise balls she threw, but imagine there were a few (grin.) And I imagine that kind of thing helped to shape Rick's opinion.

And in the course of the friendly dialog, Rick also relied on his "bucket-dad" experience catching the riseball. Certainly, virtually everyone who has ever caught (or hit against) a top riseball feels it climbs rather dramatically, almost like it is coming up a ski-jump. Sure looks like that when you are on the business end. And like any bucket-dad, Rick has obviously caught more than his share of riseballs. Unlike most of us, the riseballs he caught were near world-class (Sarah's is very good, by any standard.) So, we exchanged eMails, and Rick eventually agreed to set up a camera to capture – IN PROFILE – the entire flight and trajectory of Sarah's pitches. He sent me about 80 pitches – demonstrating most of Sarah's considerable arsenal – on a digital tape, and I broke the pitches down, then put them into RightView Pro. Using the video tools in RVP, I was able to trace the frame-by-frame movement of the ball for each of Sarah's pitches. That frame-by-frame movement is represented by the red dots in the following pictures. The green line represents the pitch trajectory established at release. The two blue lines represent my guess of high/low boundries of the strike zone (based on the 6' fence in the background).

The individual clips I pulled out of the tape were very representative of Sarah's pitches. Rick had a gun on each, and speed ranged from 58 to 63. Most were 60-62. The ball was an official NCAA, and the rubber was 43 feet. There was a slight cross-wind, and the temperature was a little below 50. The clips were shot in South Carolina, where the Paulys live.

Those more knowledgeable than me in physics – which is probably virtually everyone – should feel the freedom to correct deficiency in my logic. But I believe that the formula for the distance an object falls due to gravity is as expressed below:

D = v (t) + 0.5 g $(t)^2$ where D = distance, v = initial velocity, g = gravitational acceleration constant of 32 ft sec/sec, and t = time in seconds.

Assuming the initial velocity is 0, and that Sarah's pitch is in the air for approximately 0.43 seconds (I measured it in RVP to approximately this), that is (0 * .43) + (.5 * 32 * .43 * .43) = 2.96. Call it 3 feet. (Note that this is an approximation, but I think that it is close. The calculation assumes no downward or upward velocity - i.e. the object is at rest with respect to vertical velocity - and no ***upward* acceleration**. Both those factors would conceivably have a small effect, but are difficult to ascertain. As is the Magnus Effect – the forces created by air flow around the object – in this case a seamed ball.)

And so, accepting the approximation, and given that the .43 seconds is about a constant (elapsed time from pitch release to hitting zone) for a high-level pitcher in either BB or FP, the pitch devoid of spin (in either forum) will fall about 3 feet in the time it takes to get to the plate (in the air for 0.43 seconds). Top spin might well make it fall at a greater rate than that, and backspin can certainly make it fall less dramatically.

All of that aside, determining the constant of approximately 3 feet of vertical drop for a "basic" pitch is important only as a guideline for the discussion. Essentially, the point of comparison is the profile view of various pitch trajectories, rather than a precise measurement. Because the basic question predicating our experiment is whether backspin and Magnus Effect could EVER have such a profound effect that a pitch will rise above the trajectory established at release. I have always maintained that they can not. Many others say that spin / Magnus Effect can in fact cause a ball to rise above the trajectory established at release. And so the stage is set for our experiment.

The results of this test are clearly not scientific, and I make no such claims. Also, not conclusive, in that atmospheric conditions, spin rate, speed, height of release point, and pitcher skill could undoubtedly lead to different results. But I am confident of a couple of things:

1) Sarah's riseball is VERY good. Definitely a 99 percentile pitcher. If there is a 999 percentile pitcher who can accomplish something beyond what she is able to do, OK. But it would be so rare as to be a non-factor for the average hitter, and not a consideration for building hitting mechanics or a hitting instructional system. Even if it happens – and I personally am hugely skeptical - most hitters would never see it in their career.

2) Because the brain records the "last" image of a ball moving at the hitter well before contact (maybe 6'? – as we all know, no hitter EVER sees the ball hit the bat, though many (wrongly, as it turns out) insist that they can - and because the brain is programmed to expect a 32' ps/ps drop rate, it plots an intersection course well below the trajectory line tracked. And the brain doesn't think of this as a "dropping" ball, because it is the norm. So the brain comes to consider it as a "level" ball. When a ball doesn't fall as sharply as expected, the brain naturally enough concludes that it rose. As you will see, it didn't, but it DID drop less than expected. Which means it is still very tough to hit the pitch. In fact, the riseball may be tougher to hit than if it actually did what it is commonly assumed that it does. Instead of just being a pitch that behaves differently than the norm, it is a pitch that behaves differently in a different way than is assumed. It is both different, AND an illusion - at the same time.

Picture and Clip 1:

Sarah's fastball. The pitch moves down, and also "screws" in to a RH hitter. Good pitch. As you can see, it exceeds the drop rate predicated merely by gravity. It looks to me as if it falls about 4 feet.

Picture and Clip 2:

Sarah's roll drop. Almost as fast as the fastball, this pitch breaks down even more sharply, and breaks away from a RH hitter. This pitch is a 6-3 PO the vast majority of the time, believe me. Unless it is a swinging strike. It is breaking down what, maybe 4.5 feet? Well beyond what gravity dictates it should (absent spin).

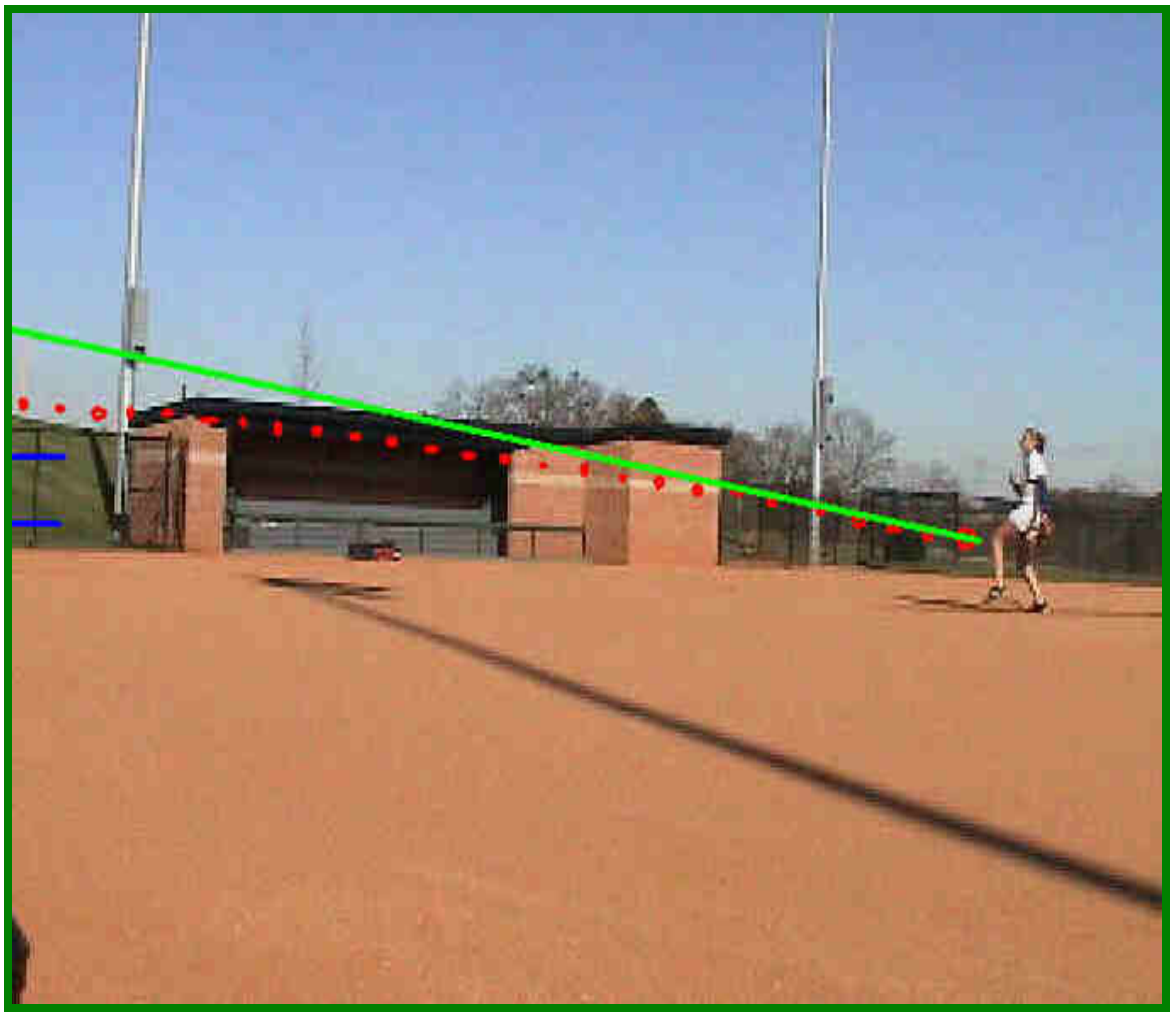
Picture and Clip 3:

Sarah's high riseball (as seen from a camera mounted in the position of the head of a RH hitter). Pretty convincing, huh? This is why people think it rises. Now, it is important to remember this pitch isn't a strike, and obviously should be taken. But Sarah can throw basically the same pitch for a strike, too, almost anywhere in the zone. But plenty of batters will swing at this one, and they obviously aren't going to hit it, so why not throw it?

Picture and Clip 4:

Sarah's high riseball (profile). Here is what it is "really" doing. I am guessing this pitch falls about 1.5 – 2 feet below the trajectory established at release. In other words, it overcomes the effects of gravity by at least a foot. However, as you can see, at no point in the pitch flight does it ever rise above the trajectory established at release. In fact, it never reverses - even for a moment - the gradually sharpening downward movement caused by gravity. The pitch ***is*** still on an upward slant through the hitting zone, though less steep an upward slant than the initially established trajectory. ***Slanting up, but not rising is perhaps an accurate description of a very high riseball.*** Not, I think what is commonly construed as the properties of a "true" riseball, but arguable. As you will see, though, it is moot when the pitch is thrown for a strike (see photos 5-6 below).

(It should be noted that this is NOT the same pitch as in Clip 3. But it was the same KIND of pitch - high rise ball. Sarah threw more than a dozen, all of which were provided to me. And they were virtually indistinguishable. She is very consistent.



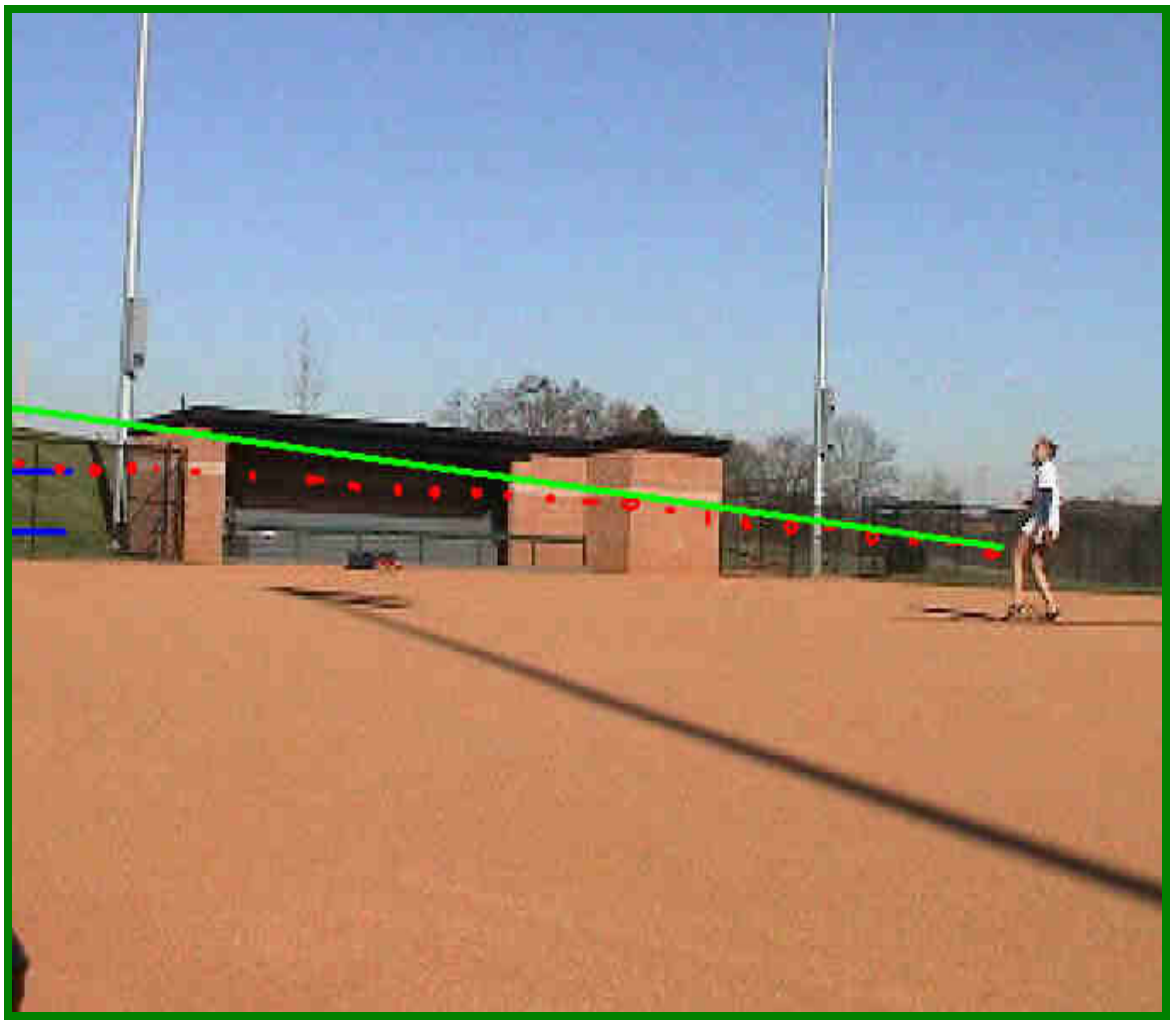
Picture and Clip 5:

Sarah's "Strike" riseball (right at the top of the zone; as seen from a camera mounted in the position of the head of a RH hitter). This will be a called strike most of the time. To my eye, it doesn't seem to be climbing quite so steeply as the high rise**. . .**

Picture and Clip 6:

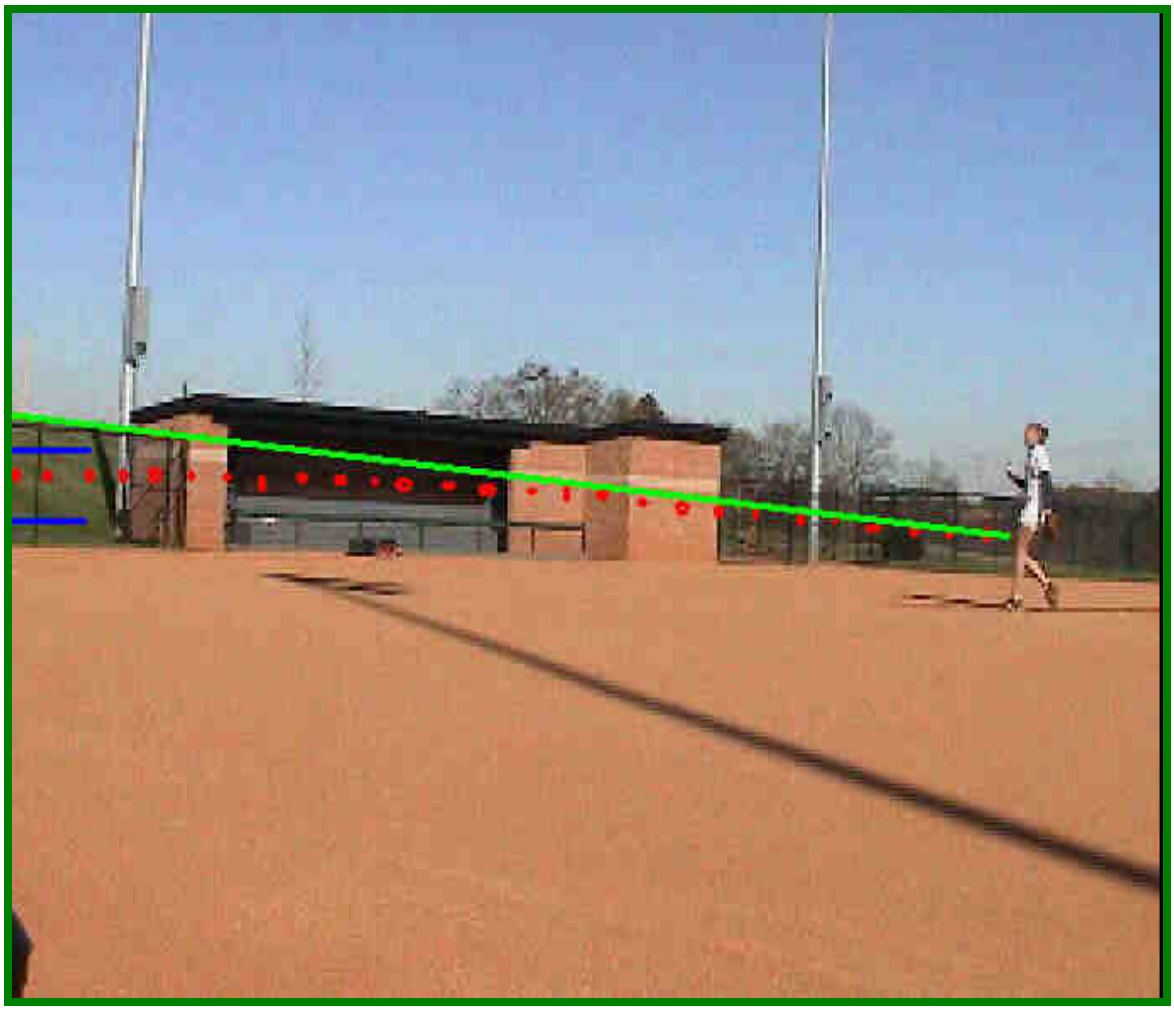
Sarah's "Strike" riseball (profile)**. . .**except, it actually has about the same delta between trajectory established at release point and where the ball ends up in the hitting zone (about a 1.5 – 2 foot delta). And as you'll see below, the same is true of Sarah's low rise. Simply by varying release point, she can throw the same pitch anywhere in the zone. This is not the norm for a female pitcher (at least until the very highest levels), and so speaks to her ability as a pitcher. But the point I want to make is that spin affects the elite pitcher's riseball similarly, no matter the height it is thrown.

Note that *when the pitch is thrown for a strike*, it is flat through the hitting area. I think this is compelling, because an MLB 98mph FB thrown at the letters is pretty close to flat, too. Maybe 1-2 degrees downward. Nobody questions the appropriate mechanics for hitting that pitch.



Picture and Clip 7:

Sarah's low riseball.



I am interested in feedback on this. Hopefully, this will spur a good discussion, and provide some interesting info to all involved in JO FP.

My thanks to Sarah, of course, and to Rick as well. I believe he was a little surprised by the outcome, but he is also sharp enough – as is Sarah – to use the outcome and knowledge to good advantage. Rick did send me an eMail where he described a recent conversation in which he told folks that his daughter's riseball didn't really rise. Apparently, they told him he was a freaking idiot (a little hyperbole on my part, but welcome to my world, Rick – LOL).

So, what to conclude:

1) Sarah is a very good pitcher.

2) The riseball does indeed have characteristics different than other pitches.

3) The riseball does not, technically speaking, rise. Instead, it sinks less than the brain thinks that it should.

4) If thrown for a strike, the riseball is probably not even SLANTING upward through the zone – typically, it is flat.

5) Optimal hitting mechanics stressing that a hitter get on plane will be as effective as anything in hitting the riseball. There is nothing about its characteristics that would remotely suggest that the rotational swing will not be effective against it.

(It's a tough pitch for any hitter, but the tendency by the mastodons of our sport is to say, "See, told you!" when a rotational hitters swings at it and misses, and to say, "Hey, great riseball" when a linear hitter misses it.

In other words, people are wed to their belief systems. I flat out guarantee you, based on specific (to these videos / photos) and much general experience in discussing hitting logic that these pictures WILL NOT convince anyone who believes the rise ball rises. In fact, enter into any such discussion planning to be amused and bemused, not disappointed. People can / do only see what they are willing to see.

Highest regards,

Scott